Volume 2, No. 3 MARCH, 1920 OLD SERIES, Vol. XVIII, No. 3

The Journal of Orthopædic Surgery

The Official Publication of the
American Orthopedic Association
and of the
British Orthopaedic Association

PUBLISHED ON THE FIFTH DAY OF EACH MONTH AT LINCOLN, NEBRASKA, U. S. A.
FOUR DOLLARS PER ANNUM
Entered as Second Class Matter in the Post Office at Lincoln, Nebraska

For the
British Orthopædic Association
Editor
R. C. ELMSLIE, M. S., F. R. C. S.
Editorial Committee
T. R. ARMOUR, F. R. C. S.
W. H. TRETHOWAN, F. R. C. S.
H. PLATT, M. S., F. R. C. S.

For the
American Orthopedic Association
Editor
H. WINNETT ORR, M. D., F. A. C. S.
Editorial Committee
MARK H. ROGERS, M. D., F. A. C. S.
E. W. RYERSON, M. D., F. A. C. S.
J. TORRANCE RUGH, M. D.

ORIGINAL ARTICLES.—Papers for publication will be accepted only for exclusive publication in this Journal. Papers in foreign languages will be accepted and translated without charge, if suitable for publication. The American Orthopedic Association and the British Orthopedic Association do not officially endorse the opinions presented in the different papers published in this Journal.

Papers for publication and all other communications for the Editorial Department should be addressed in England to R. C. Elmslie, M. S., F. R. C. S., 1a., Portland Place, London, W. 1; in America to H. Winnett Orr, M. D., Lincoln, Nebraska.

CURRENT ORTHOPÆDIC LITERATURE.—Contributions for this department should be sent to H. Winnett Orr, M. D., Lincoln, Nebraska.

REFUSED MANUSCRIPTS will be returned provided stamps are forwarded for that purpose.

ADVERTISEMENT.—Advertising forms go to press on the fifth of the month preceding the month of issue. Advertising rates will be furnished on application.

CHANGE OF ADDRESS.—When address is to be changed, both the old and new addresses should be given.

THE SUBSCRIPTION PRICE of this Journal is $4.00 per year, in advance, postage prepaid for the United States and Mexico; $4.75, for all foreign countries included in the postal union. Canada, $4.50. Single copies, 40 cents.

All communications concerning subscription and advertising should be addressed to the Publisher, and all checks, drafts and post-office orders should be made payable to

THE JOURNAL OF ORTHOPAEDIC SURGERY
Lincoln, Nebraska, U. S. A.

ROBERT LINDER

Manufacturers of

Orthopedic Appliances

Hip Splints, Arm Splints, Knee Splints,
Bow-Leg Braces, Knock-Knee Braces,
Spine and Shoulder Braces,
and Flat-Foot Soles

ELASTIC STOCKINGS and TRUSSES
of every description

No. 148 East 53rd Street, New York

Vol. 2, No. 3 MARCH, 1920 Old Series: Vol. xviii, No. 3

The Journal of Orthopædic Surgery

THE OPERATIVE CORRECTION OF PARALYTIC VALGUS*

S. KLEINBERG, M. D., NEW YORK.

*Paper read and cases presented before the Alumnae Association of the Hospital for Ruptured and Crippled, December 29, 1919.

One of the most frequent if not the most frequent complication of Poliomyelitis is permanent paralysis of the tibialis anticus muscle, combined often with paralysis or weakness of the tibialis posticus, resulting in a valgus or equino-valgus deformitory.

During weight bearing the foot in a case of paralytic valgus is in a position of abduction in relation to the leg, and the long arch is depressed or completely obliterated. If both tibiales are paralyzed, the valgus is marked, the astragalus is rotated downward and inward, and the head of the astragalus projects prominently on the inner side of the foot where a large callus appears very early. When the anticus alone is paralyzed the foot is in equinus with a varying degree of valgus. The arch of the foot is depressed usually only during weight bearing, the head of the astragalus is not prominent and is rarely covered by callus. Whether one or both of the tibiales muscles are paralyzed, if the condition is not corrected, the tendo achillis and the peronei tendons become contracted, a rigid valgus or equino-valgus develops and the patient walks with a marked limp.

If such a patient is seated and asked to dorsi-flex the affected foot, he brings it up in a position of valgus, the common extensor tendons, the tendon of the extensor proprius hallucis and that of the peroneus tertius stand out prominently, while the tibialis anticus tendon is not visible. The patient is rarely able to dorsi-flex to a right angle. When he can do so, the foot is in a position of extreme valgus for which the peroneus tertius, a small and otherwise unimportant muscle, seems to be to a considerable

degree responsible. During the attempt at dorsi-flexion, it becomes apparent that the valgus is due primarily to the absence of power on the inner side of the foot, and also to the outward pull of the extensor tendons, especially the peroneus tertius.

To correct this condition we have been doing two types of operations. One is the "Loop" operation devised by Dr. Whitman. This consists of displacing the extensor tendons inward so that when they act they will pull the foot up in a median line in relation to the leg, instead of in abduction. The other operation is a transplantation of one of the peronei muscles, preferably the longus, to the inner side of the foot to take the place of the paralyzed tibialis.

"Loop Operation."

The Loop operation is performed in the following manner. A median incision about five inches long is made over the front of the foot, ankle and lower part of the leg. The annular ligament directly below and in front of the external malleolus is cut. This permits separation and elevation of the extensor tendons en masse from the underlying structures. The peroneus tertius is then cut at its attachment. This permits displacement of the extensor tendons inward. The displaced tendons are held in their new position by the tibialis anticus tendon which is looped about them and hence the name of loop operation. The tibialis anticus tendon is cut about 1½ inches above the ankle joint and the distal part about three inches in length, is pulled out of its sheath. It is passed from within outward behind the extensor tendons, and is then brought forward and inward in front of the extensor, and is finally implanted into the substance of the tibia according to the Gallie technique.

Before implanting the tibialis anticus tendon, an incision is made over the external aspect of the leg and ankle from about the middle of the leg to the base of the fifth metatarsal. The peroneus brevis is isolated, cut at its attachment, pulled out without cutting the external lateral ligament of the ankle joint, dissected up a sufficient distance, transferred through a subcutaneous tunnel to the inner side of the leg and passed down through the sheath of the tibialis anticus tendon to the inner side of the foot. The tendon of the extensor proprius hallucis is cut opposite the first metatarso-phalangeal joint, and together with the tendon of the

peroneus tertius is brought to the inner side of the foot. The tendons of the peroneus brevis, extensor proprius hallucis and peroneus tertius are then sewed together and implanted at the site of attachment of the tibialis anticus, preferably by a suture that goes through bone. The tendons are sutured very securely, and the site of attachment is covered up whenever possible by a layer of subcutaneous tissue.

If the foot cannot be brought to a right angle or very near a right angle without much effort, the tendo archillis is cut. The wounds are then closed, and the limb is encased in plaster with the foot in adduction and at a right angle to the leg.

The other operation we have used for the correction of paralytic valgus is a combination of transplantation of the peroneus longus to the inner side of the foot through the sheath of the tibialis anticus, and implantation of the tibialis anticus tendon into the tibia. The object of the transplantation is to supply an active muscle on the inner side of the foot. It is transplanted, according to the Biesalski-Mayer method of physiological transplantation of tendons, through the sheath of the tibialis anticus. In order to prevent adhesion of the transplanted tendon to the surrounding structures as it passes across the front of the leg I have adopted the suggestion of Dr. Leo Mayer and establish a fascial bed. This is accomplished by suturing the adjacent layers of the sheaths covering the peronei and tibialis anticus tendons so that their synovial surfaces face forward and are in contact with the transplanted peroneus longus as it crosses the leg.

The tibialis anticus tendon is implanted into the tibia to act as a check to abnormal plantar flexion and abduction. This is accomplished by cutting the tibialis anticus tendon a short distance above the ankle, and pulling the distal part, usually about two and a half or three inches long out of its sheath. It is then passed upward under the annular ligament of the ankle and implanted into the tibia. It is passed under the annular ligament so that it is made to conform to the curve of the ankle instead of standing out prominently as a cord across the inner aspect of the joint. This last procedure was suggested to me by Dr. Arthur H. Cilley.

Report of Cases.

1. Sylvia T., 7 years old. Paralyzed in 1916. Right paralytic valgus. Paralysis of both tibiales muscles. Operation April 28, 1919. Transplantation of peroneus longus. Achillotomy. Tibialis anticus not implanted.

December 15, 1919. Foot in normal position. Can dorsi-flex beyond a right angle with foot in median line. Foot is in median line during weight bearing. The transplanted muscle is strongly active.

Result: Excellent.

2. Edward M., 7 years old. Paralyzed in 1916. Left paralytic valgus. Paralysis of tibialis anticus; posticus is active. Operation June 30, 1919. Transplantation of peroneus longus. Fascial plastic. Achillotomy. Tibialis anticus not implanted.

December 16, 1919. Foot is in median line. Dorsal flexion to 110 degrees. The transplanted muscle is active. During weight bearing the foot is in the median line.

Result: Excellent.

3. Milton B., 7 years old. Left paralytic equino-valgus. Paralyzed in 1916. Tibialis anticus paralyzed. Tibialis posticus active but weak. All the other dorsal flexors are weak.

Operation September 8, 1919. Transplantation of peroneus longus. Fascial plastic. Tibialis anticus tendon implanted into tibia.

December 15, 1919. Foot is in equino-varus. In standing position the foot is in normal relation to the leg. There is slight power of adduction through the flexor longus hallucis. No power of abduction. The implanted tendon is effective as a check ligament preventing abnormal plantar flexion or abduction. The transplanted peroneus is not active. Mother states that boy is improved because he stands better and does not fall as much as he did before the operation.

Result: Improved.

4. Sadie S., 6 years old. Left paralytic valgus. Paralyzed in 1916. Tibialis anticus is paralyzed. Other muscles about the ankle are active.

Operation November 1, 1919. Transplantation of peroneus longus. Fascial plastic. Tibialis anticus implanted into tibia. De-

cember 15, 1919. Foot is in equino-varus. Can dorsi-flex to a right angle. Foot goes into slight valgus during dorsal flexion. The transplanted muscle can not be felt to contract. During weight bearing foot is in median line. The arch of the foot is high and the original deformity is entirely corrected.

Result: Improved.

5. Ida W., 9 years old. Left paralytic equino-valgus. Paralyzed in 1916. Both tibiales muscles are paralyzed. Other dorsal flexors are so weak that there is no active dorsal flexion.

Operation October 6, 1919. Transplantation of peroneus longus. No fascial plastic. Tibialis anticus implanted. Tendo achillis not cut. Foot put up in plaster in 100 degrees of plantar flexion.

December 17, 1919. Foot in equino-varus. Cannot dorsi-flex. Definite resistance to abnormal plantar flexion and valgus. Transplanted tendon not active. Child walks better than before the operation.

Result: Improved.

6. Sylvia L., 3½ years old. Left paralytic equino-valgus. Paralyzed in 1916. Foot is in rigid equino-valgus. Both tibiales muscles paralyzed.

Operation April 21, 1919. Transplantation of peroneus longus Fascial plastic. Achillotomy. It is doubtful if peroneus tendon passed through sheath of tibialis anticus.

September 28, 1919. Child walks better. Foot still goes into valgus during dorsal flexion, but not to the same degree as before the operation.

Result: Improved.

7. Henry U., 6 years old. Left paralytic equino-valgus. Paralyzed in 1916. The tibiales muscles are paralyzed. The other muscles are so weak that we are dealing with practically a flail foot.

Operation, May, 1919. Transplantation of peroneus longus. Implantation of tibialis anticus.

December 17, 1919. Foot is in equino-varus. Definite restriction to abnormal flexion and abduction. Slight power in the transplanted muscle. Mother thinks he is better because he walks better.

Result: Improved.

8. Frances L., 4 years old. Left paralytic valgus. Paralyzed in 1916. Paralysis of both tibiales.

Operation. Transplantation of peroneus brevis.

December 16, 1919. Foot is in less valgus than before the operation. Foot still goes into valgus during dorsal flexion. He walks much better than he did before the operation, and with his shoe on, the foot stays in varus.

Result: Poor.

9. Max K., 4 years old. Left paralytic equino-valgus. Paralyzed in 1916. Tibialis anticus is paralyzed; other muscles are active.

Operation January 31. 1919. Transplantation of the peroneus longus.

Post-operative course. Foot through oversight was kept in plaster for six month. At the end of this time the foot was found in a position of marked and resistant varus. The foot was then placed in plaster in neutral position for one month, after which the patient left our clinic.

December 20, 1919. Foot is in extreme varus. Walking is awkward and very poor. No active eversion of foot. Dorsal flexors practically paralyzed.

Result: Failure.

A review of the above cases shows that the transplantation of the peroneus longus, especially if combined with implantation of the tibialis anticus will produce an improvement in about 70% of the cases. In some of the cases, as in the first two of this series, the result will be excellent. We must realize, however, that we cannot obtain a perfectly normal foot because we cannot reproduce the normal muscle balance about the ankle. At best we should only expect a correction of the deformity and an improvement in function. Moreover, the peroneus longus which is normally not as strong as the tibialis anticus cannot be expected to do the work of the latter, especially when it is compelled, as in this operation, to pull over an irregularly curved line running from the upper and external part of the leg across the front of the leg and down to the inner aspect of the foot. However, careful attention to details may improve our results.

The following points are worthy of emphasis:

1. The peroneus longus is preferable to the peroneus brevis for transplantation because it is longer and stronger than the brevis.

2. The peroneus muscle should be dissected free as far as possible so that the line between its origin and its site of attachment will be as nearly as possible a straight line.

3. The peroneus tendon should be passed through the sheath of the tibialis anticus so that its pull will imitate that of the tibial muscle.

4. The transplantation should be reinforced by an implantation of the tibialis anticus tendon. This is extremely important. In my earliest cases when the anticus was not fixed to the tibia it was noticed repeatedly that the foot after operation relapsed into equino-valgus. The fixation of the anticus tendon effectively overcomes this. The implanted tendon must not, on the other hand, be implanted so that it holds the foot at less than a right angle or in extreme varus, as that would make walking very awkward.

5. Fascial plastic. Theoretically it seems reasonable to expect that adhesions will be less likely to occur when the tendon passes over a synovial bed. Nevertheless, we frequently see tendons transplanted in subcutaneous tissue move very freely.

6. The ideal case for the above operation is one in which the tibialis anticus alone, or both tibiales are paralyzed, but in which the other dorsal flexors and especially the peronei are strongly active.

7. The post-operative care should include in addition to muscle training and massage, support of the foot in the adducted position by using during the day a shoe raised on the inner side, and at night a splint that will hold the foot at a right angle and in adduction.

CASE NO. 10. Sadie R., 10 years old. Left paralytic equino-valgus. Paralyzed in 1916. Paralysis of the tibialis anticus. Other muscles including the tibialis posticus, are active.

Operation August 4, 1919. Loop operation.

December 12, 1919. Foot is in slight varus. She can dorsiflex to a right angle with foot in median line. Transplanted muscle is active. There is no resistance to full plantar flexion, so that attachment of implanted anticus tendon has loosened or was not made

sufficiently taut. During weight bearing foot in normal position. Can adduct foot, motion being due to action of peroneus brevis and tibialis posticus.

Result: Excellent.

CASE No. 11. Abraham B., 5 years old. Right paralytic valgus. Paralyzed in 1916. Paralysis of both tibiales muscles. Other muscles active.

Operation October 16, 1919. Loop operation.

December 15, 1919. Can dorsi-flex to a right angle which he could not do before. During dorsal flexion foot remains in median line. During weight bearing foot is in median line. Transplanted peroneus brevis is active.

Result: Excellent.

CASE No. 12. Sylvia T., 7 years old. Left paralytic equinovalgus. Paralyzed in 1916. Both tibiales muscles are paralyzed. Other muscles are active.

Operation November 7, 1919. Loop operation.

December 17, 1919. Can dorsi-flex, holding foot in median line. Abnormal plantar flexion and abduction restricted. During weight bearing foot is in slight varus.

Result: Excellent.

CASE No. 13. Agnes McG., 13 years old. Right paralytic varus. Paralyzed 1916.

Operation September 3, 1919. Loop operation.

December 16, 1919. Foot is symmetrical, though flat. Can dorsi-flex to 80 degrees. Plantar flexion is limited to 110 degrees. Further plantar flexion is limited by the scar of the anterior wound and the implanted tendon. During walking the foot is in moderate valgus.

Result: Good.

A review of the last four cases shows that the Whitman Loop operation when properly performed yields excellent results. It corrects the original deformity, and causes a marked improvement in the function. In this series of four cases the choice of cases for operation was a more fortunate one than in the preceding nine cases in which the transplantation was done. In every one of the four cases all the muscles with the exception of the tibiales were

strongly active, while in the series of nine transplantations the dorsal flexors and peronei were often very weak.

The important points in the successful performance of the "Loop" operation are: First, thorough separation of all the extensors from the front of the ankle and foot, and their displacement inward. Second, separation of the tendon of the peroneus tertius from its attachment at the base of the fifth metatarsal. Third. Implantation of the tibialis anticus tendon.

It is interesting to note that the transplanted peroneus brevis was active in every one of the "Loop" operation cases, while in the series of transplantations, the peroneus longus was found active in only three of the nine cases. It is difficult to explain this difference.

There are several important considerations that relate to both operations.

FIRST: The ideal case for correction by either of these operations is one in which the tibial muscles are paralyzed, and the other muscles about the ankle are strongly active.

SECOND: It is necessary to examine the function of the foot very carefully before operation so that we may be able to judge the post operative results accurately. We should note whether the anticus alone or both tibiales muscles are paralyzed. We should also investigate the function of the other muscles about the ankle and learn to what extent each group of muscles is active.

THIRD: Prolonged over correction, as in one of this series, may be harmful. Five to six weeks in plaster after either operation is sufficiently long to allow the parts to become firmly united.

FOURTH: In implanting the tibialis anticus, the tendon should not be so taut as to hold the foot flexed to less than a right angle. For if firm healing takes place with the foot in this position, the mobility of the ankle will be seriously restricted, and walking will be difficult and very awkward.

FIFTH: The transplanted tendons must be sewed so securely that there will be no danger of slipping. The suture should, if possible, go through bone, and should be covered by a layer of subcutaneous tissue.

APPLICATION OF CURATIVE THERAPY IN THE WARD

BY HENRY CHASE MARBLE, BOSTON.

During the war the Government added to the resources of the Base Hospitals in France an aid to treatment, administered thru the Reconstruction Aides. During the past few months the terms have crept into use; Occupational Therapy, Physio Therapy, as if each were an end unto itself, each the only factor necessary to heal the wounded man. This is a serious mistake. Let us not be led astray from the object of the Medical Corps even in thought and talk of this therapy and that therapy but let us unit them all under a competent surgeon, pool all the resources and make towards a successful whole. Any work aside from ward work with wounded soldiers will not be included in this paper and the means and methods only that were used in Base Hospital No. 6, A. E. F. will be recited.

In direct charge of all medical and surgical work is the surgeon, either the ward surgeon or the Chief of Department. At his disposal are various resources, the nurses, the orderlies, and the aides. The work of the nurses, their devotion to duty and brilliant work is well known to this association, and the assistance of enlisted men of the Medical department was valuable and intelligent, but it will be my scope to tell of the work of the Aides, occupational and physical.

Occupational Aides

The occupational aide working under the direction of the ward surgeon strives thru simple and graded occupation, first for mental rehabilitation, second for restored function. Were the soldier well and back with his regiment, the process would be called establishing morale, but in wounded men it must be called mental rehabilitation. During this period active medical or surgical treatment is going on.

The direction of the medical officer is necessary in order that the correct amount of work shall be given. Often the men most in need of occupation are the hardest to start and afterward to keep busy, often a man doing very little work requires more, and rarely a man is doing more than is required and must be slowed

down. This is the work of the ward surgeon, and is a necessary and important detail of the after care.

Later when the patient is up in the wheel chair or about the ward on crutches, some attempt may be made towards functional restoration, again always under careful and minute supervision of the medical officer. Occupational therapy is a therapeutic resource, an assistant to after care and must be used by the medical officer as such. If he does not give it the time it requires, it fails to fulfill its purpose. As Dr. Blake said here a few days ago: "It is the man behind the splint." So in this work, it is the man behind the treatment.

PHYSIO WARD WORK

The work of the physio aide is of quite another type, but at the same time is under the immediate direction of the medical officer. Her function is to prevent deformity, to stimulate and encourage active motion, to direct and aid muscle re-education. Patients with large compound fractures were benefitted by massage and motion of adjacent joints while atrophy of the neighboring muscles was diminished. All of the work was done in the wards and careful records kept of improvement. In cases with only muscle wounds, after closure, early motion and rapid return to active work was the policy. The barometer of motion being always pain.

In Base Hospital No. 6 the daily ward visits included beside the ward surgeon or Chief of Department, the nurse, the enlisted man, who acted as splint man, and the two aides, occupational and physio. At each wounded soldier's bed the nurse reported upon the progress of the wounds and general condition; the enlisted man was on hand to adjust and rearrange the splinting; the physio aide demonstrated the muscle and joint progress; and the occupational aide showed the progress in her work. The type of occupational work found most suited for bed patients was rug making, toy making, weaving, stenciling, printing and bead weaving.

We had, because of short personnel, the opportunity at one time to compare wards in which the reconstruction aides were and were not at work, wards containing the same type of cases, wards all under the care of the same surgeon. In every case the verdict

was overwhelmingly for the reconstruction aides, a verdict not only of physical progress, but also a verdict of moral progress.

There is one further method which is closely allied with this ward work that I have found of great value. It is the application of new measuring devices to ward work, methods of fairly accurately measuring joint function. Let us now put aside old inaccurate guess methods and substitute accurate methods of measuring. Simple devices can be elaborated so that every body motion can be measured. By charting these figures, the wounded soldier follows with great interest and delight, his return to normal function.

These are simple copper or wooden frames that fit over or about the limb and are fitted with a dial and pointer. Upon this dial is recorded, after applying the apparatus, the extent of flexion or extension, the degree of abduction and adduction. These give fairly accurate readings that can be charted graphically. For instance a soldier with limited extension of the elbow, watches with keen interest the weekly measurements from 90 degrees to 100 degrees to 120 degrees, etc., out to normal. It puts aside old methods of guess and approximation and substitutes a method of accuracy.

*INTERURBAN ORTHOPEDIC CLUB

MONTREAL, CANADA, NOVEMBER 21st, 22nd, 1919

NOVEMBER 21, 1919

Leave for St. Annes' Military Hospital C. P. R. Windsor Station, 9 A. M.

9:45 Meet Col. Camerson, C. M. G.

10:15 Lt. Col. Turner, M. C.....Tendon Grafts

10:45 Capt. Patterson.....Pneumococcic Arthritis

Major Gurd.....Empyema Surgery

Capt. Lamb.....Physiology of Remedial Gymnasium

Capt. Sims.....Functional Deformities

Capt. Gilday.....Un-united Fracture of Tibia

1:00 P. M. Lunch. Officers' Mess.

2:00 P. M. Capt. Henderson.....Rectal Anaesthesia

Major Risdon.....Plastic Facial Surgery

Capt. Campbell, C. A. D. C.....

.....Dental Splinting and Mechanical Restorations

Lt. Col. Turner, M. C.....Amputation Stumps

4:40 P. M. Major Pirie.....Supernumerary Bones of Foot

7:15 P. M. Dinner. University Club.

MONTREAL GENERAL HOSPITAL, NOVEMBER 22, 1919.

9:30 A. M. Demonstration of Amputations of the Lower Extremities with Presentation of Cases, Capt. Fraser Gurd, R. A. M. C.

10:00 A. M. Conservative Treatment of Acute Suppurative Arthritis with Illustrative Case, Capt. Fraser Gurd, R. A. M. C.

10:20 A. M. The Care of the Bladder in Cases of Paraplegia Following Fracture of the Spine, Col. J. M. Elder, C. M. G., C. A. M. C.

10:50 A. M. War Injuries of the Bone—Destruction, Regeneration and Repair, Major L. J. Rhea, C. A. M. C.

11:10 A. M. Clinical Deductions from Bone and Joint Specimens of the Canadian War Museum, Lt. Col. A. T. Bazin, D. S. O., C. A. M. C.

11:50 A. M. Plates Illustrating Oxygen Injection of the Abdominal Cavity for X-Ray Diagnosis, Capt. W. A. Wilkins, C. A. M. C.

12:10 P. M. Fractures of the Femur in War. Deductions made from the Treatment of 1,000 Cases. Lt.-Col. F. J. Tees, M. C., C. A. M. C.

12:40 P. M. Capsulorrhaphy of the Shoulder Joint with Shortening of Coracoid Process for Recurrent Dislocation of the Shoulder, Dr. J. A. Nutter.

1:00 P. M. Lunch as the guests of the Management of the M. G. H.

If time will permit, Lt. Col. Mackenzie Forbes will give a series of demonstrations on living patients illustrating methods of treatment practiced in the Orthopaedic Service of the M. G. H.

*Although late, the above program and a few paragraphs from the proceedings are presented because of their special interest.

CHILDREN'S MEMORIAL HOSPITAL, NOVEMBER 22, 1919.

2:30-3:00 P. M. Demonstration of the Gymnastic Treatment of Scoliosis, by Rotation, Miss Asplet and Miss Torrance.
3:00-3:20 P. M. Pressure Paralysis with Illustrative Case, Dr. A. A. Robertson.
3:20-3:40 P. M. A Series of Cases Illustrating the Results of Operative Treatment of Claw Foot and Anterior Metatarsalgia, Dr. A. Mackenzie Forbes.
3:40-4:00 P. M. Congenital Lues with Illustrative Cases, Dr. H. Rupert Derome.
4:00 4:20 P. M. The Sequelae of Epidemic Meningitis with Illustrative Case, Dr. H. B. Cushing.
4:20-4:30 P. M. Excision of the Knee in Children for the Maintenance of Stability Following Paralysis, Dr. A. Mackenzie Forbes.
4:30-5:00 P. M. The Complications and the Sequelae of the Severe Forms of Scoliosis, Dr. H. B. Cushing.
5:00-5:20 P. M. The Operative Treatment of Scoliosis with Illustrative Cases, Dr. A. Mackenzie Forbes.
5:20 P. M. Departure for the Royal Victoria Hospital.
5:30 P. M. Royal Victoria Hospital. New Building.

NOVEMBER 21, 1919, ST. ANNE'S MILITARY HOSPITAL.

Address by Col. Cameron.

Col. Cameron stated that in the Canadian Army there were finally 541,000 men, only 83,000 of these were conscripted and 465,000 volunteers. The Canadian Medical Service had about 31,000 beds overseas and treated over 500,000 cases. The Military Hospitals' Commission at present is known as the Soldiers' Civil Re-establishment Bureau, whose chief function was to step in after the Army Medical Department had ceased treatment of cases, because in 1918 it was found that the original Hospitals' Commission was impractical apart from the regular Army Medical Department who finally took the work over, providing about 17,000 beds in Canada. In Montreal, the center at St. Anne's has been the main facial center and the chief neurological center. The facial center is soon to be moved to Toronto. The chief Orthopaedic center, one of four, is in Toronto. The hospital at St. Anne's comprises a total capacity of about 1,000 beds with excellent equipment. It is probable that early in the year 1920, the whole hospital will be handed over to the Soldier's Re-establishment Commission and the Army Medical Department will cease to have direct control.

After Col. Cameron's address, Lt. Col. William G. Turner showed numerous cases of tendon transplantations chiefly for musculo-spiral paralysis. He stated that they had come to the conclusion that it was not worth while to wait after a year for musculo-spiral recovery but to do tendon transplantation at once. They often, when tendon transplantation is decided upon, do a nerve exploration first for the sake of data concerning pensions. They have come to the conclusion that the studies of the sensations are not of great value. They have found apparent return of sensation but at exploration a very wide space

between nerve ends. In cases of non-union of ends, where there is a bad scar, they have followed the plan of excising the scar first, and two or three weeks later doing the bone graft, always preceded by an injection of 1,500 units of anti-tetanic serum.

Capt. Sims discussed the treatment of functional cases and their diagnosis. The organic cases were not considered. The two classes which it was important to differentiate, he considered to be the reflex nervous cases and the hysterical cases. In the reflex nervous cases the deformities are characterized by atrophy of the muscles generally above the injury. The affected limb has the lower temperature. Electric reactions are somewhat diminished, but there is no reaction of degeneration. The vasomotor disturbances consist of the blood pressure being lower in the affected limb, the tendon reflexes being increased but are never exaggerated as in hysteria. These reflexes remain increased under deep anesthesia which is not true of hysterical cases. The treatment which he had found most useful was by hot water and Faradic baths and considers that very few completely recover. For the hysterical cases, he considers the treatment should be psychotherapeutic in some form. Often a demonstration by electrical contraction will persuade the patient of his ability to move the limb.

Col. William G. Turner gave his conclusions as to the points of election for amputation. He believed that amputations of the foot gave serviceable stumps if in front of the mediotarsal joint. He considers that the Chopart was unsatisfactory because of the subsequent pull of the tendo Achillis. He believed the Symes to be extremely satisfactory. He said that the amputations in the lower third of the leg have been a great disappointment and very unsatisfactory. They are subject to abraisons, circulation is poor and they all suffer in cold weather. He considers amputation through the knee joint unsatisfactory, because of the flare of the condyles and difficulty of fitting an inconspicuous appliance. The Gritti-Stokes he considers satisfactory with cat gut or aponeuritic suture. He thinks the antero-posterior scar of the thigh is better than the lateral or transverse scar.

Dr. Teese talked about fracture of the femur. Dr. Teese had had a chance to observe and take part in the treatment of 1,000 cases. In most of the hospitals they were treated by the Thomas splint, which was attached to the leg, and then tied securely to the foot of the bed, the foot of the bed being raised 6 to 8 to 12 inches, and the splint suspended from the ceiling, with the ropes pulling in such a direction that they also helped in the extension. A portable X-ray machine was used, and the plates were taken in two planes every two weeks. Skeletal traction was found to be far preferable to skin traction. They used Beesley's caliper, or some similar caliper. If the fracture was in the lower third of the femur, calipers were put well forward on the condyle. In all the many hundreds of cases in which calipers were used, damage was done in only three by slipping. In the control of sepsis, they depended upon (1) efficient traction, and (2) free incision, rather than upon Carrel Dakin. The incision was in the muscle plane between the extensors and the hamstrings, i. e., an external lateral. Hemorrhage was controlled by efficient traction. In regard to the use of Sinclair glue, they found it to be excellent in many cases, but it should not be used with picric acid, because it blisters. Where it was

necessary to lengthen the femur after loss of substance, a notch slipping operation was done, pulling apart the mortise. Sinclair's net was described in the treatment of compound septic fracture of the pelvis and hip joint.

AT THE CHILDREN'S HOSPITAL, NOVEMBER 22, 1919

Dr. Cushing talked about the sequalae of meningitis. He explained that it is endemic in Montreal. In 1917 there was an epidemic, and there have been sporadic cases ever since. Differential diagnosis must be made from acute pneumonia, arthritis, tuberculosis, and meningitis. The most successful treatment is by lumbar puncture, and serum, but it is necessary to get polyvalent serum. The sequalae are deafness, blindness, and arthritis, which is one of the most common. At first the disease is a septicemia. One of the dangerous sequalae is non-suppurative, internal hydrocephalus. There is no treatment of any avail, although he showed one boy in which one puncture with emptying of the ventricles of the brain gave complete and permanent relief.

Dr. Forbes showed cases in which he had stabilized knees in infantile flail legs. His method is to do an erasion of the cartilage with a saw. He puts the knee up in slight flexion. There should be a slight bowleg to counteract the tendency to knock-knee in these cases. He uses a nail or couple of nails to maintain the position according to the method of Stiles.

OCCUPATIONAL THERAPY AT MILWAUKEE

(From a Recent Report)

The Curative Workshop and Occupational Therapy Department at Columbia Hospital was made possible by the Junior League of Milwaukee and was opened May 5th, 1919. The Hospital provided the building and pays for heating, lighting, and so forth. The Junior League equipped the shop and is paying running expenses, and the salary of the Director, and providing volunteer assistance from time to time.

This department is under the direct supervision of the medical staff. The doctors prescribe the work for the patients. At first they are only permitted light occupations which can be brought to the bedside. When ambulatory they are able to work in the sun parlors, and later to go to the shop, where heavier work can be undertaken. After being dismissed, the patients can still keep up their treatment, as the Junior League provides automobiles to carry the patients back and forth to the shop.

The Director is assisted by nurses who are in training at Columbia Hospital. They are required to give at least three weeks to the study of occupational therapy. In addition, students who have completed the training course in occupational Therapy at Milwaukee-Downer College are detailed to hospital occupational therapy under the Director at Columbia Hospital.

The Junior League has equipped the Department with the Mackenzie Reconstruction Apparatus for re-educating muscles and joints that have been stiffened through operation or sickness. This apparatus includes the following:

1 Finger stretcher.

1 Bench and arm table with a creeping board, treadmill with weights, finger machines, wrist circumductor, wrist adductor, wrist roll and supinator.

Ankle Circumductor, foot drop machine with weights, foot evertor, knee and hip rotator, parallel bars and ladder with eversion and inversion treads.

1 Protractor.

The shop has looms and Velocipede scroll saws for exercising the knees and ankles, and the handles of tools are adjusted to fit

the deformity of the patient's hands. Mr. A., for instance, had an injured wrist which left the hand paralyzed. He spent 45 hours in the shop making a tabor of hard oak, on which it was necessary for him to use a scraper that gave his wrist the desired movement.

Mr. B. loosened a stiff knee by operating a foot power scroll saw for 97 hours.

Mr. C. had a crippled shoulder which he was convinced could not be used. Basketry and toy making proved to him that he could use his shoulder. After 74 hours in the shop he returned to work.

Mr. D., paralyzed from poliomyelitis, improved the use of his muscles by the use of the drill-plane and scroll saw so that he was able to return to his work.

Miss E. was a case of melancholia. After finding a new interest in weaving and basketry she was able to regain a more optimistic point of view and find work.

Mr. F., a boy of 17 years, compelled to wear a cast from his waist down for six months, is being brought to the shop so that he may be as active as possible and the atmosphere of work may be kept before him.

The shop is a delight to the children who have to stay in the Hospital for long periods of treatment. They spend many hours in the shop making toys, playing the Victrola, painting baskets and other articles for patients confined to their rooms.

The shop is equipped to provide wood work, weaving, basketry, toy making, book binding and many light crafts for the bedside patients.

Number of patients treated between May 5th, 1919, and February 1st, 1920:

Aggregate number of hospital patients, May, 31; June, 63; July, 93; August, 93; September, 76; October, 148; November, 119; December, 157; January, 91.

Aggregate number of out patients, May, 12; June, 16; July, 36; August, 21; September, 20; October, 20; November, 26; December, 23; January, 28.

Number of hours spent by out patients in shop, June, 89; July, 173; August, 101; September, 152; October, 200; November, 186; December, 185; January, 247.

Teaching Force: Director, Hilda B. Goodman; assistant, Elsa Dudenhaefer, at Children's Hospital.

Student Nurses since September: 12.

Students from Milwaukee-Downer College: 7.

Financial Statement: Cost of installation, operating, etc., to February 1st., $3,000.00.

The work was extended to the Milwaukee Children's Hospital November 1st, 1919.

Number of patients: November, 49; December, 51; January, 56.

Teaching Force: Director, Hilda B. Goodman; assistant, Elsa Dudenhaefer; aides, Alice Ogden, Dorothy Brown.

Editorial

Directly and indirectly the editor of this Journal has had a good many inquiries in regard to the brace making side of the work of the orthopedic surgeon. Except for those surgeons who are in the largest cities the securing of well made, perfectly fitting, efficient apparatus presents great difficulties. More than this, to secure apparatus at the exact time when needed, unless the brace shop is within a few city squares, is usually impossible.

In all the military orthopedic and reconstruction establishments a brace and splint shop, however incomplete, was always to be found. The necessity of this shop was always recognized and usually met fairly well. At some of the hospitals in France the braces and splints made were hastily constructed from odds and ends of material. As a rule, however, these braces and splints were usually ready when wanted, fitted fairly well, and were quite efficient.

Many of the men who were required to produce splints and braces in these shops have profited by the experience and are themselves establishing or encouraging the establishment of such shops as adjuncts to their hospitals or offices here at home.

For the assistance of such men the editor has asked for and received the following information from the splint shop in the University of Iowa. Dr. Steindler has succeeded in developing not only an excellent clinic in this new hospital but a well equipped and extremely productive shop. In regard to the shop he reports as follows:

"Up to August, 1919, the shop was only inadequately equipped and our yearly output was only about three hundred (300) orders, which included braces as well as Orthopedic shoe work.

Machine Room, Old Equipment: 1 Throatless Shears, 1 Small Gas Forge, 1 Drilling Machine, 1 Coal Forge, 1 Set Polishing Heads.

In August the following equipment was bought: 1 Power Shears, 1 30-lb. Power Hammer, 1 Brazing Outfit, 1 Rockford Milling Machine, 1 6-in. South Bend Lathe.

All these machines are run by 1½ horse power motor.

Leather Room, Old Equipment: 1 Singer Leather Sewing Machine, 1 Dandy Jack.

Additional equipment bought in August: 1 Duhrkop Sewing Machine.

We also got all necessary tools for steel and leather work.

The additional equipment amounted to an outlay of between nine hundred and one thousand dollars ($900 to $1,000). The value of the total equipment being not over eighteen hundred to two thousand ($1,800 to $2,000).

In addition to the one experienced leather worker, and shoe worker, we have an experienced machinist. For the leather and finishing work we also have two women helpers.

The output in the fiscal year 1918-1919 amounted to a total of three hundred and five (305) orders, braces and Orthopedic shoe work. This did not include repair work.

I am able to give the output on the basis of the last four months as follows: The yearly output would be not less than between 900 and 1,000 braces. About 10% of these are body braces, 40% braces for the lower extremities, 14% braces and splints for the upper extremities, 36% Orthopedic shoe work.

The cost price for these braces range between one to five dollars ($1 to $5) for splints, thirteen to eighteen dollars ($13 to $18) for leg braces, twenty-two to thirty-eight dollars ($22 to $38) for standard body braces.

This includes the cost of construction, wages, losses and depreciation.

With the present working force of four people the output capacity will probably be increased this year to 1,200 orders.

We contemplate the addition to this equipment a nickel plating outfit. This will increase the durability of the braces and save time by lessening the demands for repair.

The above list does not include any repair work."

A. STEINDLER.

The supervision of such an establishment as this or a smaller one adds greatly to the responsibilities of a busy surgeon. Once the shop is in successful operation, however, it will be found that the much better service that can be given to patients and the greater satisfaction to the surgeon resulting therefrom are very great compensations. In even a small shop it is possible to turn out one or two splints or braces a day, usually within twenty-four to forty-eight hours of the time the measurements are taken. Also, necessary alterations and readjustments can be made in the same shop at any time and with more satisfaction.

SOCIAL SERVICE FOR CRIPPLES AT CARDIFF, WALES

During the time the writer was on duty with the British in South Wales, he was much impressed with what a certain kind of social service was doing for the crippled, in and about Cardiff. Influenced by Sir Robert Jones, and under the immediate direction of Col. Sir John Lynn Thomas, the war wounded in the Welsh Orthopedic Center, and in the Prince of Wales (amputation) hospital, were receiving excellent attention.

For civilian cripples a few beds were provided and Dispensary service was given at the King Edward VII Hospital with Mr. Geary

Grant in charge, and Mr. J. O. D. Wade as one of the consulting surgeons.

Even so, at first glance it seemed that very little was being done for the cripples of so large a civilian population. Later one learned that there was a society known as The Cripples Society. Dr. Hoyle, of the Welsh Museum is chairman of the committee and Mr. Hodges has looked after the detail work of locating patients and arranging some kind of care for them. The following abstract of a recent report to the committee shows how helpful such work can be in the absence of a special institution for the care of this class of patients:

"1919"

Some 170 cases have been seen during the past year. Sixty of these are old cases now cured and earning their living in various ways, or they are former cases of the Cripples Aid Society, now under Dr. Gilchrist (Tuberculosis officer). Fourteen are new cases —six of these have been or are at the present time in hospitals, four have had irons and boots.

The remaining ninety odd, are in touch with the Society for various reasons, such as requiring new high-boots, irons, or spinal jackets at intervals. Some are awaiting beds at the London Hospitals or having recently returned home need visiting to see that they are progressing satisfactorily, wearing their irons, etc.

Ten cases are receiving or have received treatment at the London Orthopaedic Hospital during 1919, and three have been at the Bristol Royal Hospital. Nine cases have been for day expeditions to London, to be fitted with new boots and irons; this means going up twice, once to be measured and once to be fitted.

Six cases have had boots made in Cardiff. Four cases have had a much needed change at the "Rests," and a spinal case had a month at Weston. Two cases have received much benefit from massage, extending over some two months. One small boy of four, being unable to walk at all, even in his irons, at the commencement of treatment, was able at the end to walk about quite freely, across roads, etc.

Various bathchairs are lent out and some of these have required new tyres and so forth. The Society is also supporting Winnie Glidland, a very bad case of Infantile Paralysis, who is

being educated at Halliwell, Wischmore Hill, and two boys are being trained to a trade at Wrights Lane, Kensington. Another case is Doris Davies, age 6, one of six children under fourteen, who is at the Cheyne Hospital at the Society's expense. Her mother has been in an asylum for a year and there was no one to look after the child at home."

That Cardiff will eventually have a special hospital for crippled children is very likely but in the meantime, The Cripples Society deserves great credit for what has been and is being accomplished.

Correspondence

ANNOUNCEMENT 1920 ANNUAL MEETING OF THE AMERICAN ORTHOPEDIC ASSOCIATION.

To the Editor of the Journal of Orthopaedic Surgery:

It is felt by the President that the following information will be of interest to the members of the Association:

The next meeting of the Association will be held in Toronto, Canada, on June 7, 8, 9 and 10, 1920. Monday, the 7th of June, will be a Clinical day and preparations are well under way to make this a most enjoyable and profitable day. It is hoped as many members and guests as possible may plan to be present to take advantage of the opportunities of seeing the work of the Canadian hospitals, both military and civilian. The three following days will be occupied with the regular program of the Association, and the Program Committee is already at work and a most attractive program is planned.

We had hoped to have the British Association meeting with us in joint session, but on account of war conditions the Secretary of the British Association states it will be impossible to accept our invitation.

We have, however, individual acceptances of our invitation by a number of continental surgeons, and we are delighted to be able to state that Sir Robert Jones will be present, together with a number of other men from the British Isles who have rendered distinguished service during the war. Among these are Major Naughton Dunn of Birmingham, Major T. H. Armour of Liverpool, Major Rowley Bristow of London, and others. Professor Jacques Calvé, of Berck Plage, France, has also promised to be present and contribute to our program.

Professor Putti, of the Rizzoli Institute, Bologna, Italy, has also consented to visit us and will make an interesting contribution.

Toronto is a noted convention city and should be at her best in June.

Will not all the members make a personal effort to be present that the Association may go "over the top" in an effort to reach our objective, namely, the greatest meeting in the history of the Association.

CLARENCE L. STARR, *President.*

To the Editor of the Journal of Orthopaedic Surgery:

Having read with much interest the article on tuberculin by Dr. Kleinberg, published in your issue for December, and also the remarks of Dr. Landman and Dr. Leo Mayer in the January number, we should like to add our experience, having used tuberculin in treatment in over 200 cases.

We had our early training under Dr. Ellis Bonime at the Polyclinic Hospital in 1915. After carefully studying the method of treatment for six weeks, we decided to place some thirty cases of bone and joint tuberculosis which we had under our care at the time on tuberculin.

So as to test out tuberculin therapy thoroughly at the outset of our study, we placed all our available cases under the treatment. There was no selection of cases, the mild as well as the severe ones were put on it alike, and among them there were some very remarkable cures.

John P., age 7; had severe tuberculosis of one tarsus and one hip. He had been in the hospital 14 months and in spite of the best orthopedic treatment he was steadily getting worse. At the time tuberculin was added to his treatment the two affected joints had been discharging pus profusely for many months, and the astragalus had been spontaneously thrown off; apparently he was a hopeless case. Four months after tuberculin was added to his treatment he was up out of bed, and in the course of two years he was pronounced cured in August, 1917, and has remained well ever since.

Joe P., aged 9; had been in the hospital four years with hip and ankle tuberculosis, both joints were suppurating profusely. Notwithstanding all our orthopaedic treatment he did not improve, but seemed to be slowly failing. When tuberculin was added to his treatment he began to improve rapidly, and in four months' time was allowed to be up on crutches. The sinuses, of which he had several, were treated with bismuth paste and autogenous vaccines. He was discharged cured, February, 1918, two and one-half years from the time tuberculin was started, and has remained well since.

James S., aged 2¾; was first seen at the hospital October, 1911, and a diagnosis of Pott's disease with slight deformity was made. He was treated with plaster of Paris jackets and did as well as the average case does under that treatment. In February, 1913, the advantages of a spinal graft operation were explained to the child's mother, and with her consent the Albee operation was performed. The wound healed by primary union and in four months' time the boy was discharged from the hospital simply wearing a Taylor back brace for protection. In December, 1915, he returned to the clinic and a diagnosis of acute pulmonary tuberculosis was made. With the aid of our social visitor, he was fixed up at home in bed with the windows open and merely brought to the clinic twice a week for tuberculin treatment. He improved rapidly, making an uninterrupted recovery in the course of 18 months, and has remained well, needing no treatment since May, 1917.

V. S. was a lad of 10 years of age, of well-to-do parents, able to give the boy the best of care and living in a country town much frequented by New York business men. When first seen he had tuberculosis of one wrist joint with a good sized abscess and also tuberculosis of one knee. The abscess was opened and much creamy pus was evacuated. Both joints were put in plaster of Paris and the patient allowed to walk on crutches. The wrist joint responded to treatment and recovered with good motion in the course of two years. The knee, however, did not do well and in two and one-half years from his first visit his hip joint lighted up. From that time on he became worse, having night cries and all the symptoms of acute hip disease. The boy was given

every advantage. An upper outside porch was built and a special nurse obtained. He was given the most careful orthopaedic treatment. Notwithstanding all that was done for him, he steadily became worse. Both his knee and hip joints suppurated and finally when he seemed to be in a hopeless condition, as a last resort, tuberculin was added to his treatment. After two weeks of tuberculin therapy his parents noticed an improvement which steadily continued until recovery took place in about two years' time.

After two years of extensive use of tuberculin, we published* our results, from which the following summary is taken:

"Table 1. Summarizes the results in the treatment of fifty cases in the Home for Crippled Children without tuberculin, and Table II shows the results of treatment in an equal number of cases treated with tuberculin in the Home for Crippled Children, in the Mountainside Hospital Clinic and in private practice.

We will give the conclusions which have been drawn from these tables and refer to some special cases by number.

Without tuberculin 16 recovered, or 32 per cent; 25 died, or 50 per cent; 9 are still wearing braces and under treatment, or 18 per cent.

With tuberculin 33 recovered, or 66 per cent; 5 much improved, or 10 per cent; 6 died, or 12 per cent; 5 still under treatment, or 10 per cent; 1 discontinued tretament, or 2 per cent.

Of the cases treated without tuberculin the total period under treatment for the entire number was 235 years and 9 days; the average length of the treatment for each patient was 4 7/10 years.

Of those treated with tuberculin the total time of treatment for all the patients was 54 years, 11 months and 9 days, an average for each patient of 1 year and 1 month.

Of the 16 cured without tuberculin the average period of treatment for each case was 5¼ years.

Of the 33 cures with tuberculin the average period of treatment for each case was 11½ months.

Of the 25 deaths without tuberculin the whole period of treatment was 72 years, 11 months, 9 days, or 3 years, 14 days for each patient.

Of the six deaths of those treated with tuberculin the total period of treatment was 4 years, 9 months and 29 days, or an average of 9 months, 13 days for each patient.

Of those treated without tuberculin, nine are still under treatment.

Of those treated with tuberculin, five are still under treatment."

Before the advent of tuberculin in our practice, we considered that the time necessary to cure tuberculosis of a joint was from three years to an indefinite number of years. Since we have used tuberculin we consider the average length of time to produce a cure to be from one to two years. By this we do not mean to say that every case is cured in two years or less, but we do mean to infer that by the careful use of tuberculin in conjunction with

proper orthopaedic care the time required to produce a cure is cut down from 50 per cent to 75 per cent and the cures are much more permanent.

When tuberculin therapy was instituted at the Home for Crippled Children we had a number of chronic cases which we had been treating for years and the ward dressings were a round of pus cases. A few months of tuberculin therapy with the use of suitable vaccines and bismuth paste were sufficient to clean up the pus cases to such a surprising extent that only a case here and there was discharging any pus to speak of.

In using bismuth paste, care was taken not to inject it into blind pockets and if these were found by the X-ray suitable counter openings were made so that all the sinuses could be flushed from beginning to end. It might also be mentioned that tuberculin was not used exclusively, but where there was any suspicion that a child had a syphilitic taint, regardless of a negative Wasserman, mixed treatment was used at intervals or alternating with tuberculin.

We consider that the use of tuberculin is absolutely essential for the rapid cure of bone and joint tuberculosis, but no set rules can be laid down for its administration in all cases. Each physician who attempts to use tuberculin should be carefully and properly instructed in its use and in its abuse. Set rules for teaching purposes and as guide posts for beginners are of the utmost importance, but after the student of tuberculin therapy has mastered the rudiments of the science and as he goes on carefully studying his cases, it gradually dawns upon him that his set rules, which were so valuable in his early days of instruction, must gradually be discarded and after all the patient, and not the disease, must be treated.

A tuberculin reaction is never justifiable. We do not wish to infer that we never get a reaction, but if we do we at once reduce the dose to one-tenth the amount so as to insure prevention of another one.

The great fault of tuberculin therapy lies in the administration of it in too large and too often repeated doses. A good rule to follow is, the more the patient needs tuberculin the smaller the dose should be. We have almost entirely given up the lower dilutions of tuberculin, such as one in ten and one in one hundred. The dilutions we most frequently use are 1 in 100,000, and 1 in 10,000. Usually no heavier doses are needed, although patients may need several short interrupted courses.

Sincerely,

SIDNEY A. TWINCH, M. D., F. A. C. S.
ALFRED STAHL, M. D.

24 Fulton St., Newark, N. J.

Personal

Dr. Charles Dwight Napier has returned to civil practice after an extensive military service. Dr. Napier is at 100 Lafayette Avenue, Brooklyn, New York.

Dr. John V. Hartman, who was with Base Hospital No. 9 at Chateauroux and later consultant in Orthopedic Surgery at Kerhuon, Brest, has returned to private practice. He is at 131 West Sandusky St., Findlay, Ohio.

Dr. Henry Keller has relocated at 143 W. 86th St., New York City.

Dr. Herman C. Schumm, who was Evacuation Medical officer for the Nantes Hospital Center during the active period following the armistice, is now located at 141 Wisconsin St., Milwaukee, Wisconsin.

Dr. Thomas Madden Foley has relocated in civil practice and is at 1334 Nineteenth St., Washington, D. C.

Dr. Walter I. Baldwin, who was on military duty with the British at Edinburgh for almost two years, has returned to civil practice. He is at 800 Powell St., San Francisco.

Dr. W. K. West has located at 508 S. W. National Bank Building, Oklahoma City. Dr. West has been making a study trip in orthopedic surgery by way of preparing for association with the orthopedic department in the Medical School of the University of Oklahoma. Dr. West has spent some time recently with Dr. Porter in Chicago, and has visited also the clinics of Dr. Gaenslen of Milwaukee, Dr. Steindler of Iowa City, and at Omaha, Lincoln, and St. Louis.

Dr. W. E. Meredith, who was in charge of the surgical service at Camp Dodge, Iowa, and Dr. R. T. Miller, who was Chief of Surgical Service, Base Hospital No. 27, Angers, have returned to practice in Pittsburg and have both resumed their duties in the University of Pittsburg.

Dr. J. P. Lord, Dr. R. D. Schrock and Dr. W. E. Wolcott, have joined in a co-partnership for the exclusive practice of Orthopaedic, Bone and Deformity Surgery, 830 City National Bank Bldg., Omaha. Miss Helen King, formerly of Boston, is in charge of the Physiotherapy Department.

In the distribution of funds by the United Hospital fund of New York City, the New York Orthopedic Hospital has recently received about $21,500, the hospital for Ruptured and Crippled over $15,000 and the hospital for Deformities and Joint Diseases about $4,000. This distribution is made on the basis of free treatment provided by the different hospitals during the past year. The number of free patients treated, and the cost per day, determines the amounts to be given to those New York hospitals which receive part of their support from this fund.

Orthopaedic Titles in Current Literature

PREPARED BY DR. J. E. M. THOMSON, LINCOLN, NEBR.

Aguilar, F. Criado. Fracture of Femur. Archivos de Ginecopatia, Obstet y Ped., Barcelona, September, 1919, Vol. 32, No. 9, p. 221.

Aimes, A. Non-tuberculous Spinal Arthritis. Progres Med., 1919, p. 366.

Albee, F. H. Studies in Bone Growth; an Experimental Attempt to Produce Pseudarthrosis. A. J. of Med. Sciences, Philadelphia, January, 1920, 159, No. 1, p. 40.

Allen, D. K. Orthopedic Surgery in American and British Hospitals. Northwest Medicine, Seattle, Wash. December, 1919, Vol. 18, No. 12, p. 258.

Aperio, G. Total Necrosis Clavicle. Policlinico, Rome. November, 1919, 26, Surgical Section, No. 11, p. 349.

Ayguesparsee. A Foreign Body in the Thigh. J. de Med. de Bordeaux, 1919, XC, p. 417.

Bazy, P. Vertical Fracture of the Pelvis with Wide Separation of the Pubic Bones. Bulletin et Mem. Soc. de Chir. de Par., 1919, XIV, p. 1283.

Barbarian. The Treatment of Pott's Disease by Bone Grafting. Presse Med., Paris, 1919, XXVII, p. 590.

Barber, H. Bone Deformities of Renal Dwarfism. Lancet, London, January 3, 1920, No. 5027, p. 18.

Bidou, Gabriel, Paris. De 'l Orthopedic Instrumentale.

Blake, J. A., U. S. Army. Early Experience in the War. Military Surgeon, December, 1919, 45, No. 6, p. 626.

Boeckel, I. The Treatment of Radial Paralyses by Tendon Anastomoses. Presse Med., Paris, 1919, XXVII, p. 624.

Bohme, A. Pathologic Conditions in the Skeleton from Under Nutrition. Deutsche Medizinische Wochenschrift, October 16, 45, No. 42, p. 1160.

Bonneau, R. Mechanical Correction of Fractures. Journal de Chirurgie, Paris, November, 1919, 15, No. 4, p. 371.

Bowlby, A. Gunshot Fracture of Femur. British Med. Journal, January 3, 1920, No. 3079.

Bradtrud, A. F., Minneapolis. Diagnosis and Treatment of Peripheral Nerve Injuries. Minnesota Medicine, St. Paul, February, 1920, 3, No. 2, p. 57.

Brown, A. J. A Contribution to the Study of Stiff and Painful Shoulder. Surg., Gyn. and Obst., 1919, XXIX, p. 381.

Brau-Tapie (I). Comminuted Fracture of the Radius Gaz. Hebd. de Sc. Med de Bordeaux, 1919, XL, p. 244.

Brenizer, A. G. Bone, Fascia, and Fat Grafting. Charlotte, M. J., 1919, LXXX, III, p. 137.

Byrne, J., and Taylor, A. S., and Boorstein, S. W. The Early Surgical and Orthopedic Treatment of Hemiplegia. Surg., Gyn. and Obst., 1919, XXIX, p. 398.

Campbell, W. C. Fibula Transference for Tibial Defect. J. Orthop. Surg., 1919, XVII, p. 625.

Cannaday, J. E. Caliper Extension in the Treatment of Fractures of the Femur. J. Am. M. Assn., 1919, XXIII, p. 1281.

Calderon, C. Treatment of Spindle-Cell Osteosarcoma, Medecina Ubera, Madrid, November 22, 1919, 9, No. 107, p. 139.

Chevalier, G. The Clinical Diagnosis of Closed Traumatic Lesions of the Wrist. J. de Med., Bordeaux, 1919, XC, p. 367.

Chutro, P. Treatment of Arthritis of the Ankle from War Wounds. Journal de Chirurgie, Paris, November, 1919, 15, No. 4, p. 364.

Chodax, H. Chorea Complicated by Gangrene of the Fingers. Proc. Roy. Soc. Med., London, 1919, XII, Sect. Study Dis Child., p. 87.

Clifton, A. L. Bone Surgery. U. S. Navy M. Bull., XIII, p. 718.

Colvin, A. R., St. Paul. Clinical Course and Pathology of an Osteitis Causing Loose Bodies in Joints. Minnesota Medicine, February, 1920, 3, No. 2, p. 65.

Cotte, G. Synovectomy in the Treatment of Chronic Hydrarthrosis of the Knee. Bull. et Mem. Soc. de Chir de Par; 1919, XLV, p. 1256.

Cowijon and Dide, M. Hyperthrophic Neurites Revue Neurologique, Paris, November, 1919, 26, No. 11, p. 825.

Crile, G. W. Value of Military Surgery in Civilian Practice. Illinois Medical Journal, January, 1920, 37, No. 1.

Danforth, M. S. Advances in the Surgery of Extremities During War. Rhode Island Medical Journal, Providence, January, 1920, 3, No. 1, p. 1.

Darget, R. Some Forearm Fractures. J. de Med de Bordeaux, 1919, XC, p. 353.

Delrez, L. War Wounds of the Joints. Arch Med., Belges, 1919, LXXII, p. 513.

Diaz, Lira E. Congenital Luxation of Hip Joint. Revista Medica de Chile, Santiago, November, 1919, 47, No. 11, p. 840. Conclusion.

Duval, P. The Treatment of War Wounds of the Joints. Surg., Gyn. and Obs., 1919, XXIX, p. 222.

Dubreuilh, W. Reverdin Skin Flaps. Journal de Med. de Bordeaux, December, 25, 1919, 90, No. 24, p. 545.

Dunorgey, I. Sarcoma of the Upper Part of the Thigh Involving the Soft Parts. J. de Med. de Bordeaux, 1919, XC, p. 388.

Gas Gangrene of the Lower Limb Treated Conservatively with Recovery, J. de Med. de Bordeaux, 1919, XC, p. 413.

Deyarier, C. I. Vicious Radial Callus with Loss of Function. Bull. et. Mem. Soc. de Chir. de Par., 1919, XLV, p. 1284.

Pseudarthrosis of the Forearm. Journal de Chirurgie, Paris, November, 1919, 15, No. 4, p. 333.

Dozier, H. C. Preventable Deformities of the Upper Extremity. Internat. J. Surg., 1919, XXXII, p. 289.

Eisler, F... Pathologic Bone Conditions from Undernutrition. Munchener Medizinische Wochenschrift, Munich, September 12, 1919, 66, No. 37, p. 1057.

Elmer, Walter G., Philadelphia. The Foot and Shoe Problem. Abst.: Proceedings of Philadelphia Medical Society, October 8, 1919; Medical Record, Vol. 96, No. 24, p. 992.

Evans, H. M., U. S. Army. Physical Reconstruction in Army Hospitals. Military Surg., January, 1920, 46, No. 1, p. 33.

Evans, T. J. Fractured Sesamoid Bone of the Thumb. Arch. Radiol and Electrotherapy, 1919, XXIV, p. 116.

Evans, W. A., Detroit. Nontraumatic Epiphysial Separations. American Journal of Roentgenology, November, 1919, 6, No. 11, p. 543.

Everidge, J. A Model to Demonstrate the Methods Carried Out in the Mobilization Treatment of Knee-Joints. Proc. Roy. Soc. Med. London, 1919, XII, Clin. Sect., p. 10.

Finney, J. M. T., Baltimore. Lessons From the War. Southern Medical Journal., Birmingham, January, 1920, 13, No. 1, p. 40.

Frazier, C. H., and Silbert, S. Philadelphia. Five Hundred Cases of Injuries of Peripheral Nerves at U. S. Army General Hospital No. 11. Surg., Gyn. and Obst., January, 1919, 30, No. 1, p. 50.

Gardner, C. B., U. S. Army. Treatment of Infected Wounds with Demonstration of the Carrel Dakin Technic, Michigan State Medical Society Journal, Grand Rapids, January, 1920, 18, No. 1, p. 1.

Gentil. A Viciously Consolidated Dupuytren Fracture Treated by Osteotomy of the Fibula and Tibis. Bull. et Mem. Soc. de Chir. de Par., 1919, XIV, p. 1236.

Gill A. Bruce. Deformities of the Hand. Abst.: Medical Record, Vol. 96, No. 24, p. 992.

Glasson, C. J. Unusual Fracture of Os Calcis. Archives of Radiology and Electrotherapy, London, December, 1919, 24, No. 233, p. 228.

Gottlieb, A., San Francisco. Industrial Injuries; Prevention of Loss and Restoration of Function. North West Medicine, Seattle, December, 1919, 18, No. 12, p. 267.

Graphic Presentations of Finger Deformities. Surg., Gynec. and Obst., 1919, XXIX, p. 420.

Grosse, A. Antero-Internal Luxation of the Left Shoulder with Paralysis of the Brachial Plexus. Rev. de Orthop., 1919, XXVI, p. 563.

Guillot and Deheely. The End Results of the Treatment of Pott's Disease by the Hibb's Method. Presse Med. Par., 1919, XXVI p. 590.

Harries, D. J. Malunion in a Fractured Tibia Due to the Tendon of the Tibialis Anticus. Indiana M. Gaz., 1919, Liv., p. 340.

Hawley, George W. Some Improvements in the Mechanical Treatment of Fractures. Medical Record, December 6, 1919, Vol. 96, No. 23, p. 948.

Haywood, C., Elkhart. Some Fractures of Pelvis. Indiana State Medical Assn. Journal, January 15, 1920, 13, No. 1, p. 8.

Hinton, D., Philadelphia. Application of War Surgery to Industrial Practice. Pennsylvania Medical Journal, Athens, Pa., January, 1920, 23, No. 4, p. 188.

Japha, A. War Diet in Relation to Rachitis. Berliner Klinische Wochenschrift Berlin, September 29, 1919, 56, No. 39, p. 921.

Jeanne and Mouchet. Injuries of the Wrist. Bull. Med. Par., 1919, XXXIII, p. 572. Closed Traumatic Lesions of the Wrist. Presse Med., Par., 1919, XXVII, p. 585.

Johnson, R. W., Jr., Baltimore. Time Element in Reconstructive Surgery. J. of Orthopedic Surgery, January, 1920, 2, No. 1, p. 33.

Jones, A. R., London. Roentgenograms of Case of Tuberculosis of One Hip Associated with Congenital Dislocation of Other Hip. Journal of Orthopedic Surgery, January, 1920, 2, No. 1, p. 4.

Jones, F. W., London. Anatomy of Snapping Hip. Journal of Orthopedic Surgery, January, 1920, 2, No. 1, p. 1.

Jones, J. P., Camden, Ala. Treatment of Fractures of Femur from an Orthopedic Point of View. January, 1920, 2, No. 1, p. 13, Journal of Orthopedic Surgery.

Jones, R., Liverpool. Joint, Nerve and Other Injuries in War Surgery. Surg., Gynecology and Obst., January, 1920, 30, No. 1, p. 1.

Juvara, E., Bucharest. Fracture of the Malleolus. Presse Medicale, Paris, December 6, 1919, 27, No. 74, p. 743.

Kidner, F. C., Detroit. Treatment of Septic and Injured Joints. Michigan State Medical Society Journal, Grand Rapids, January, 1920, 18, No. 1, p. 16.

Kleinberg, Samuel, New York. Dislocation of Carpal Scaphoid and Semilunar Bones. Journal of A. M. A., Vol. 74, No. 5, p. 312, January 31, 1920.

Koch, S. L. Primary Suture of Gunshot Wounds with Some Remarks Upon the Application of Similar Principles in Civil Surgery. Surg., Gynec. and Obst., 1919, 29, p. 362.

Kreglinger. Isolated Fracture of Acetabulum. Deutsche Zeitschrift fur Chirurgie, Leipzig, January, 1919, 148, No. 1-2, p. 129.

Kreuter, C. Aneurysm of External Iliac Vein. Zentralblatt fur Chirurgie, Leipzig, December 6, 1919, 46, No. 49, p. 977.

Lavalle, C. Robertson. Bone Implants in Treatment of Tuberculous Joints. Analis de Inst., Models de Clin. Med., Buenos Aires, January-December, 1919, 4, p. 8.

Lavoie, J. R. Elongation of the Transverse Process of the Fifth Lumbar Vertebra as a Cause of Backache. Illinois Medical Journal, 1919, XXXVI, 197.

Le Mesurier, A. B. The Use of Orthopedic and Prosthetic Appliances in the late Treatment of War Disabilities. Medical Quarterly, 1919, 1, 179.

Lee, B. J. Contribution of War to Surgery of the Knee Joint. Annals of Surgery, 1919, LXX, 464.

Lefevre and Gaignerot. Secondary Fracture of the Clavicle. J. de Med. de Bor deaux, 1919, XC, 413.

Loubat. Two cases of Fracture at Upper End of Femur. J. de Med. de Bordeaux, 1919, XC, 367.

Long, J. The importance of an Early Diagnosis of Weak Foot in Children. Medical Times, 1919, XLVII, p. 253.

Marinacci, S. Wounds of the Knee Joint. Clin. Chir., 1919, XXVI, p. 119.

Mauclaire. Tendon Anastomoses to Remedy Definite Total or Partial Radial Paralysis. Presse Med. Par., 1919, XXVII, p. 509.

Mouchet, A., and Pilatte, R. Fractures of the Semilunar Cartilage. Rev. d' Orthop., 1919, XXVI, p. 521.

Mowell, F. W., Olympia, Wash. Pott's Fractures. North West Medicine, Seattle, Wash., December, 1919, 18, No. 12, p. 265.

Naegeli, T. Dislocation of the Atlas. Deutsche Zeitschrift fur Chirurgie Leipzig. September, 1919, 148, 3-4, p. 269.

Nussbaum, A. Splint for Fractured Femur. Munchener Medizinische Wochenschrift, Munich, September 12, 1919, 66, No. 37, p. 1056.

Paguchi, K. Physiologic and Pathologic Examination of Nerves and Muscles of Domestic Fowl. Suffering from So-Called "Polished Rice Disease." Japan Medical World, Tokyo, December 14, 1919, No. 313.

Partsch, F. Increased Incidence of Osteomalacia. Deutsche Medizinische Wochenschrift, Berlin, October 9, 1919, 45, No. 41, p. 1130.

Parkinson, J. P. Case of Syphilitic Bone Disease. Proc. Roy. Soc. Med., London, 1919, XII, Sect. Study Dis. Child., p. 83.

Patel. Consolidation in Infected War Fractures. Presse Med. Par., 1919, XXVII, p. 624.

Patterson, Robert F. The Short Caliper Splint. A. M. Assn., February 7, 1919, Vol. 74, No. 6, p. 390.

Peltzer, R. Bastos. The Deep Posterior Aponeurosis of the Leg. Anales de la Lacultod de Medicina, Montevideo, September, October, 1919, 4, No. 9-10, p. 698.

Pereda, Y., Eloide, P. Nutritional Derangement and Rachitis. Progresos de la Clinica, Madrid, September, 1919, 7, No. 81, p. 117.

Picot, G. Treatment of Compound Fracture of Lower End of Femur. Journal de Chirurgie, Paris, November, 1919, 15, No. 4, p. 351.

Pitres, A. Substitution, Compensation and Vicarious Action in the Symptomatology After Injury of Nerves. Journal de Medicine de Bordeaux, December 25, 1919, 90, No. 24, p. 535.

Potherat, E. Fracture of the Head of the Fibula with a Comminuted Fracture of the External Tuberosity of the Tibia. Bull. et Mem. Soc. de Chir. de Par., 1919, XLV, p. 1282.

Propping, K. Snapping Hip. Deutsche Zeitschrift fur Chirurgie, Leipzig, February, 1919, 148, No. 3-4, p. 251.

Putti, V. The Treatment of Severe Shortening of the Femur. Clin. Chir., 1919, XXVI, p. 85.

Remmets. U Clamps for Fractures. Leipzig, Deutsche Zeitschrift fur Chirurgie, January, 1919, 148, No. 1-2, p. 118.

Robin. Intra-articular, Bicondylar Cuneiform Fractures of the Upper End of the Tibia. Lyon Med., 1919, CXXVIII, p. 391.

Roth, P. B. Apophysis of the Os Calas. Proc. Roy. Soc. Med., London, 1919, XII, Sect. Study Dis. Child., p. 19.

Rowan, J. J., Jr., Dubuque, Ia. Serum Treatment of Epidemic. Poliomyelites Occurring in Dubuque During Summer of 1918. Medical Record, N. Y., December 13, 1919, 96, No. 24, p. 972.

Rowlands, R. P. Fracture Dislocations of Ankle Pott's and Dupuytren's Fractures. British Medical Journal, London, December 6, 1919, 2, No. 3075, p. 735.

Royster H. A. The Barrel Stave Splint in Fracture of the Clavicle. Annals of Surgery, 1919, LXX, p. 474.

Rugh, J. Torrance. Deformities of the Spine and Joints. Proceedings of Philadelphia County Medical Society, October 18-19. Medical Record, Vol. 96, No. 24, p. 992.

Santos, Alipio. Treatment of Fractures. Archivos Brasileiros de Medicina. Rio de Janeiro, Aug. 19, 1919, No. 8, p. 666.

Sargent, P. Surgical Aspects of Spinal Tumors. British Medical J., London. January 10, 1920, 1, No. 3080, p. 38.

Scherwood, Walter A. Disabilities of the Knee Joint. Medical Record. December 6, 1919, Vol. 96, No. 23, p. 948.

Schlasberg, H. I. Treatment of Leg Ulcer. Hygiea, Stockholm, November 16, 1919, 81, No. 21, p. 880.

Schwartz, E. Semi Rigid Sound Introduced Through the Vagina Removed from the Left Thigh after formation of a Fistulous Abcess. Bull. et Mem. Soc. de Chir. de Par., 1919, XLV, p. 1276.

Shere, O. M. Indications for Operative Treatment in Cranial Fractures. Colorado Medicine, Denver, January, 1920, 17, No. 1.

Smith, F. F. S. Treatment of Fractures of the Patella. Indian M. Gaz., 1919, p. 336.

Smith, M. K. Gunshot Fractures of the Humerus. Annals of Surgery, 1919, LXX, p. 430.

Smith, M. T. Injuries of Knee Joint. Northwest Medicine, Seattle, Wash., December, 1919, 18 No. 12, p. 263.

Sowles, H. K. Necrosis of the Index Finger from Lysol: Report of a Case. An Argument for the Thorough Mixing of such solutions. Boston M. and S. J., 1919, CLXXXI, p. 510.

Sorrel, E., and Truffert. Osteoma of the Brachial Triceps. Rev. d' Orthop., 1919, XXVI, p. 539.

Shoemaker, J. Fractures of the Neck of the Femur. Necterl Tydschr and Geneesk,, 1919, II, p. 333.

Steindler, A., Iowa City, Ia. Stripping of Os Calcis. Journal of Orthopedic Surgery, January, 1920, 2, No. 1, p. 8.

Surgery of Paralysis of the Arm. Journal Orthopedic Surgery, 1919, XVII, p. 608.

Tavernier, L. The Sequals of Sprains of the Knee. Lyon Chirurgical. July-August, 1919, 16, No. 4, p. 345.

Thompson, H. B. Osteomyelitis and Its Classification Reontgenographically. Northwest Medicine, Seattle, December, 1919, 18, No. 12, p. 270.

Truedale, E. P. The Tourniquet: A Modification of an Instrument Employed by the Germans in the Late War. J. of A. M. A., Vol. 74, No. 5, p. 314, January 13, 1920.

Tubby, A. H. Orthopedic Surgery. Practitioner, 1919, ciii, p. 241.

Turner, G. G. Uses of Free Transplants of Fascia Lata in Surgery. British Medical Journal, London, January 17, 1920, 2, No. 3081, p. 79.

Vance, C. A. Fracture of Lower End of Humerus. Southern Medical Journal, January, 1920, 13, No. 1, p. 50.

Van de Velde, J. Fracture of the Lower Third of the Femur. Ann. Surg., 1919, LXX, p. 461.

Verdesoto, J. E. Healing of Fracture Under Lane Plate. Bolstin de Medicina Y. Chirugia, Guayaquil, August, 1919, 17, No. 133, p. 118.

Vignard, P. An Early Treatment of Acute Osteomyelites. Presse Med., Par., 1919, XXVII, p. 501.

Villcor, R. A Case of Deep Lipoma of the Arm. J. de Med de Bordeaux, 1919, XC, p. 338.

Zuelzer, R. Artificial Arm After High Amputation. Berlin Klinische Wochenschrift, Berlin, September 29, 1919, 56, No. 39, p. 919.

Current Orthopaedic Literature

A Consideration of Some of the Problems Presented by Amputations. By Clarence L. Starr, M. D., Toronto, Lieut.-Col., C. A. M. C., Ottawa, Ont. *The Journal of the American Medical Association*, Vol. 73, No. 21, November 22, 1919.

An ideal stump should have a linear scar free from puckering or infolding of the skin, with sufficient flap to cover the end of the bone, but without redundancy. It should have a pad of fat and subcutaneous tissue over the bone end, and should not be adherent. The joints above the amputation should have a full range of motion.

Surgical Problems

1. All tissues harbor latent infection, which may be lighted up very easily. In some instances, massage and manipulation of the stump may be sufficient to produce a cellulitis which may become very troublesome. Rest, and in some cases incision is required to drain local collections of pus.

2. Ulcers remain in some cases after old, so-called guillotine operations, or may result from breaking down of scar. These ulcers and scar tissue should be excised and a linear scar substituted. This is often possible without sacrificing any length of bone, if adhesive strips are attached to skin above the ulcerated area, and extension made by means of weight and pulley, or by means of modified Thomas knee splint. It is very good practice to attempt skin grafting in these ulcerated areas.

3. A sinus or a series of sinuses may combine, and are sometimes very difficult to get permanently healed. These sinuses persist as a result of either a foreign body at the bottom, or owing to the fact that they have developed a rigid, noncollapsible wall of fibrous tissue, and on removal of the cause they will invariably heal promptly.

4. Spurs of bone or exostoses are of frequent occurrence, and various explanations are given for their presence. The most common explanation given and accepted is that they are due to a tearing up and partial detachment of shreds of periosteum, from which new bone is developed in all sorts of irregular shapes. The theory is offered that they are due to small bone fragments broken off by the saw, or by snapping the last small bit before the saw cut is complete, or by the sawdust itself.

5. Nerve buds or fibroneuromas are not infrequently found. The oblique cutting of the nerve, the fish-tail section, the stripping back of the sheath, cutting the nerve at a higher level, and then tying the sheath over the cut ends —all these methods are advanced; with the greatest amount of success probably following the last named method.

Non-Operative Problems.

1. Edema persists in most stumps for some weeks after all wounds are healed. No permanent appliance should be applied until this has subsided, and

the atrophy of unused muscle tissue has taken place. The disappearance is hastened by suitable pressure bandage together with massage of stump. It is more efficiently treated by additional use of a temporary peg with plaster or leather bucket. Deformity is nearly always present in a greater or lesser degree in the joint above the amputation. This is due to contraction of the muscles controlling the joint, to long continued flexion position, to adhesions of opposing muscles to one another and to the bone, to infection or infiltration with blood, or it may be due to adhesion from infection or blood in the joint itself.

2. Loss of muscle power as a result of disease exists in all amputation stumps and a considerable training is necessary before the stump is in a good condition to swing an artificial appliance and make good use of it. For the purpose of improving muscle tone regular classes are formed in the gymnasium and workshops.

A Consideration of the Various Types of Amputations

In the lower extremity, an amputation of the toes, provided the plantar is brought on top, is almost no disability. One toe should never be left as it soon becomes distorted, and adds no element of usefulness. The tarsometatarsal amputation can be made very satisfactory if the peronei are left intact on the outside, and the tibials on the inside. The midtarsal amputation results in an unbalanced foot with elevation of the heel and downward pointing of the foot.

The Syme amputation is theoretically and practically the best in the lower extremity and yet it is surprising how many of these are faulty. The chief defect is too long a flap or too much bone removed from the end of the tibia and fibula, resulting in a bearing end which is not stable, and which rolls forward or to one side.

In the leg an amputation should not be done within a hand-breadth of the ankle, in order to give ample room for an ankle joint properly placed in an artificial leg. Above this point the longer a stump can be made, the better leverage is given and the easier the man will walk, and the less limp is developed.

In the thigh as in the leg, the longer the lever the better the artificial limb may be used. The Gritti-Stokes is the best of the thigh amputations and is to be selected in preference to the knee-bearing. This gives a very good end-bearing stump when the operation has been well done.

A stump under 5 inches in length from the perineum can scarcely ever be fitted with an artificial leg without a pelvic band, and all such should be so fitted. Amputations at the level of the trochanter minor or above, including disarticulation at the hip, have insufficient leverage to use a thigh bucket, and a pelvic cradle, the so-called "tilting table" of the English manufacturers, must be adopted, with automatic lock joints both at hip and knee.

The end-bearing stump is of great assistance in permitting the easy locomotion of the wearer of an artificial limb, but aside from the two types, a Syme in the leg and a Gritti Stokes in the thigh, a complete end-bearing stump is never possible. It is possible both in the leg and in the thigh to get a partial end-bearing stump in a good many cases, properly supplied with a good pad

over the end of the bone. This partial end-bearing stump is best accomplished by means of the hammock suspended in the bucket, by means of which the wearer may graduate his weight bearing.

Any of the digits which can be saved in a useful position may be found of great assistance as an opposing factor to a mechanical appliance. Fingers whose tendons, both flexors and extensors are hopelessly tied up and the joints of which are destroyed by the overgrowth of the fibrous capsule, may be advantageously sacrificed to make way for a hook or some similar device. At the wrist, the whole carpus is rather a detriment than a benefit and should not be saved, especially when the carpal joints are fixed. The artificial appliance supplied to such a hand will be long and cumbersome and not easily manipulated.

When possible, the radio-ulnar articulation at the wrist should be maintained, as it permits of the most useful movements of pronation and supination. In the forearm, the length of the stump is the chief factor in determining the usefulness of the arm, as each inch of stump adds materially to the leverage, and to the power of such an arm. A stump of 1½ inches or less below the fold of the elbow is useless as it pulls out of the bucket in attempts at flexion. When movement alone is of value, even if no power can be developed, a leather cap over the short stump with a compound lever may be utilized successfully.

The policy has been to furnish a permanent peg and an artificial limb to each man who has an amputation of the lower extremity, and a working arm and a so-called dress arm to those who have an amputation in the upper extremity. The attempt to combine the two arms in one has not been satisfactory.

The Peg Leg.

The peg leg is a temporary appliance based on the Thomas knee splint. It has a shaped ring at the top, taking the top of the bucket of the artificial leg as a pattern. This takes the bulk of weight on the tuberosity of the ischium, and eliminates the troublesome pressure on the perinium. The ring is well padded and leather covered. A little behind the center of the ring, two steel bars drop to a point well below the stump, where they unite in a ferrule, into which is fitted a wooden peg ending in a wide rubber walking pad. A leather bucket is attached to the posterior half of the ring only, and by a loop around each side bar. The lacing is made smaller than the circumference of the thigh, so as to permit snug fitting, for the purpose of shrinking the stump. A hammock is slung in the lower part of the bucket to permit of padding to encourage the weight bearing, or short of that to keep up even pressure on the stump to prevent local edema. This whole splint is suspended from the opposite or both shoulders by the usual webbing braces. The peg without joint at the knee for above-knee amputations has been selected because it has been established that they get about more securely, and walk better and with more confidence than they do with either a peg with flexible knee-joint, or with a temporary leg of the usual pattern. All pegs should be at least three-fourths inch shorter than the corresponding leg.

Wood was selected for the bucket of the standard limb because it is worn the most comfortably of any of the materials used. It does not sweat and

macerate the skin, it is lighter than leather, and once having been fitted accurately, does not change its shape. This is especially true of the below-the-knee type.

ARTIFICIAL ARMS.

After thorough trial it has been found that the very complex mechanical arms are not satisfactory, and they have been eliminated. They are found heavy, with the greatest weight at the point farthest from the body, namely, in the hand. They are for the most part metal, and in our western country are claimed to be very cold.

After all one's ingenuity is exhausted, and every device has been tried, it is still found that it is difficult to fit some men with apparatus with which they can "carry on" in civil life, unless one can instil into them that element that seems to be lacking, namely personality or character. It is impossible to prevent others who have this character in large measure from doing anything that "any white man can do" as one of them expressed it, even if their appliances are crude or home-made.

For this reason every effort is made by encouragement, by example, by contact with others similarly afflicted who are able to accomplish useful tasks, and by training and enthusiastic support of the medical officers to improve the morale of this type of afflicted patient.—*Leo C. Donnelly, Detroit.*

:TREATMENT OF CAUSALGIA. RESULTS OF INTRANEURAL INJECTION OF 60% ALCOHOL. By Dean Lewis, M. D., Chicago and Wesley Gatewood, M. D., Iowa City. *The Journal of the A. M. A.*, Vol. 74, No. 1, January 3, 1920.

Causalgia has as its prominent feature pain which is described as burning or throbbing in character and is often compared to the sensations produced by pin pricks, a red hot iron or an injury of the flesh. This pain, which never ceases, even at night, may be aggravated by any number of causes and finally become paroxysmal.

Weir Mitchell believed the pain due to an ascending neuritis which might involve any injured nerve and gradually involve all the nerves of the extremity affected. It seems to have been demonstrated as a result of surgical interference, that the median nerve is involved most frequently in causalgia affecting the upper extremity, and the internal popliteal in causalgia involving the lower extremity.

The pathology differs widely in different cases. Joyce has reported five cases, in one of which the median nerve when freed from scar tissue appeared swollen and bluish gray, mottled with purple spots. A small neuroma, which was adherent to the biceps, was found on the nerve. In another patient who complained of severe pain in the foot when walking, sitting or lying down, but who had no paralysis or anesthesia, there was found on roentgenographic examination a small foreign body in the neighborhood of the sciatic nerve. When the operation was performed the foreign body was found imbedded in scar tissue just posterior to the nerve. Immediate and permanent relief of pain fol-

lowed removal of foreign body. Gosset found the median nerve only slightly affected in the operations performed by him to relieve causalgia affecting the hand. In one of the cases observed, the median and ulnar nerves were definitely enlarged and indurated just above the antecubital fossa; in another, the internal popliteal nerve was surrounded by some adhesions which were not dense and the long saphenous nerve, which was subsequently injected below the wound appeared normal. In both of these cases, neurolysis had been previously performed, but had given no relief. In the third case, the median nerve appeared injected and some what enlarged, but its consistency did not differ from that of a normal nerve.

Sixty per cent alcohol seems in some cases to interrupt the conduction of sensory impulses, but not to interfere with the transmission of motor impulses.

When this injection is made, the nerves affected should be exposed under general anesthesia. The injection should be made above the wound or site of the injury, for in those cases in which the injection has been made below, the results have been temporary. From 1 to 2 c.c. of 60% alcohol should be injected. As this is injected the nerve swells and becomes white, resembling in color a nerve that has been fixed in alcohol for histologic study.

Whenever neurolysis is performed in cases of causalgia it should be combined with an intraneural injection of 60% alcohol. Neurolysis alone, does not control the pain in many cases, and in those in which there is some relief, it is but temporary.—*Leo C. Donnelly, Detroit.*

Bone Grafts. W. I. de C. Wheeler. *Dublin Journal Medical Science*, July, 1919.

Wheeler points out, in the discussion of the function of the periosteum, that in operations on children the bone-producing layer is raised with the fibrous layer and the membrane is capable of producing new bone with mathematical accuracy. In adults, on the other hand, subperiosteal resection may or may not be followed by new bone formation, according to whether or not the osteoblasts are detached from the bone while the periosteum is being separated. From a practical point of view, absence of periosteum from an implanted graft means slower vascularization and longer convalescence for the patient. The bone graft is not merely a scaffold, but is really living and carries its own osteogenetic power. This is shown by the formation of callus in a fractured graft. Accidental infection of the field of operation only leads to failure of the graft when the infection is in a streptococcal or other severe form. It is not true that bare bone is of necessity devitalized and will end in sequestration in infected fractures. The same observation applies to a bone graft. It is, therefore, inadvisable to remove loose fragments in the early treatment of septic fractures, or to disturb a bone graft in the presence of accidental infection. The first considerations in bone grafting are how to fix the graft and the method of immobilization. The slightest movement in a grafted bone may lead to failure. In old ununited fractures, where radical shortening is inadvisable, a graft which extends well beyond the sclerosed ends will have the best chance of success. A sliding graft has to depend on defective bone, and is therefore unreliable.

When shortening is done, the "step" method should be used. The intramedullary peg yielded excellent results in the author's hands, but there is a danger of fracture during convalescence. In the bones of the forearm intramedullary grafting is favoured, but for the larger bones the more stable lateral inlay grafts are preferred. When the inlay graft is used, the upper end is laid in a groove and in addition is pushed into the intramedullary cavity for a short distance; the lower end is fixed in a prepared groove by passing catgut sutures around the graft. Rigid fixation by mechanical means prolongs the time of operation and adds the risk of complications. In all the author's cases except two the graft consisting of periosteum, compact bone, endosteum and marrow, was taken from the tibia by means of Albee's twin electromotor saw. The risk of fracture following the removal of grafts from the tibia can be minimized by avoiding the crest of the tibia and by advising the patient to wear a plaster casing for some months. Deformities should be corrected before grafting is attempted. Fixation is advisable for about three months after the operation, but it is to be remembered that reasonable function is the only way of encouraging complete restoration of the defective area.—*J. E. M. Thomson, Lincoln.*

TREATMENT OF WIDE RESECTIONS OF THE SHOULDER. Dionis du Sejour. *Revue de Chirurgie*, March-April, 1919, No. 229.

The deplorable functional results following extensive resections of the shoulder, so frequent in the war, seem to have urged the author to a special study of the subject. The ideal treatment of a flail shoulder (quoting Mauclaire) is to graft a bony humeral head onto the remaining shaft. Practice, however, does not as yet come up to such a high ideal. Conservative treatment by means of prosthetic apparatus is satisfactory in some cases, but cumbersome forms of apparatus which encircle the thorax, elbow and neck as well as the shoulder are to be avoided because of the tendency to impair muscular action. Numerous schemes for utilizing the remaining muscle have been devised by various surgeons. Chutro sutures the trapzeius of the fascia of the deltoid. Walther has sutured the remaining fibers of the deltoid to the clavicle, the scapula having been destroyed. Many have tried suspension of the humeral shaft to the acromion by wire. The interposition of an ivory head for the humerus has been tried with incomplete success.

Placing the upper extremity of the shaft in the glenoid (which is the method studied in this paper) was practiced as early as 1860 by Chenu, without, however, keeping the arm fixed in abduction. It is of small importance whether this upper end be large or small, concave or convex, irregular or smooth. The author's observations comprise 37 cases, 15 of which he had resected himself and 22 which came for treatment after resection elsewhere. In the first group the reposition of the humeral shaft into the glenoid was done four or five days after the primary resection. The shaft is held in place in the glenoid by an apparatus made of plaster and small iron rods which holds the arm in extreme abduction and allows access to the wound. Fixation of the end of the shaft by bronze wire through the acromion was tried and abandoned because of re-

sulting infection and necrosis of the bone. The immobilization is kept up for about two months. Patients thus treated recover with the greater part of function in the shoulder, the movements of abduction and adduction being due largely to leverage of the scapular muscles. More often the result is a pseudarthrosis, which is a good thing if the deltoid is capable of function. If the deltoid is all gone a bony ankylosis is to be sought for. In 12 of the 15 cases a minimum elevation of 45 degrees with normal function of the forearm was obtained. Three cases showed mediocre results because of failure of bony ankylosis, the deltoid in each case being already gone.

Of the 22 cases remaining, 17 have given satisfactory results, one even after a loss of 15 cm. of the humeral shaft. Three which had complete atrophy of the deltoid had poor result. Thirty-two cases are reported in detail.—*William Arthur Clark, Rochester, Minn.*

FRACTURES OF THE SEMI-LUNAR. Mauchet and Rene Pilatte. *Revue D'Orthopedic.* September, 1919.

The authors considered especially the compression fracture of the semi-lunar bone. These fractures are comparatively rare and are usually found in individuals from 20 to 40 years of age, seldom in infancy. According to Mourgeus among 60 cases of fracture of the wrist, the semi lunar was fractured 5 times or in 8%, while the scaphoid was fractured in 70% of the cases.

Fracture by direct violence is not known. Fractures are always caused by indirect violence mostly following a fall upon the hand in flexion and extension and sometimes following a fall upon the ends of the metacarpals. The position in which such fracture occurs is flexion and extension combined with ulnar adduction of the wrist. When the wrist is placed in abduction to the radial side the shock is transmitted to the outer side of the carpus and often causes fracture of the scaphoid, while with ulnar abduction the shock is transmitted to the ulnar side of the carpus and fracture of the semi-lunar occurs.

Clinically the following symptoms are observed: Shortening of the length of the wrist by impaction and pain, the latter might be the first symptom. It is situated immediately below the articular surfaces of the radius and is considerably increased by longitudinal pressure upon the third metacarpal.

Functional disturbance is very marked, especially if fracture of the scaphoid accompanies the semi-lunar fracture. The natural course of the disease often tends toward increasing the disability. The consolidation of the fragments is the exception. The painful symptoms persist usually. Often a traumatic arthritis of the wrist becomes established which adds to the functional disability. There is often a slight and persisting edema of the wrist. The principle features of the X-ray findings are as follows: Shortening of the wrist caused by flattening of the semi-lunar bone; this might amount to 5 to 10 mm.; changes in the contour of the bone itself, i. e., shortening in its vertical axis and flattening. The semi-lunar bone is also changed as to its location as it might be displaced to the volar or dorsal surface of the os magnum or scaphoid. The

internal structure of the bone is also changed, it appears mottled and shows vacuoles.

Immobilization is indispensible in the treatment of fractures of this kind. In cases with considerable functional disability the early removal of the bone has been done by the authors. Immobilization after resection should be carried out in slight extension. The movement of the fingers and hand should be taken up very early. The authors do not recommend the removal of the semi lunar bone but believe that one should resort to rest, hot applications and hydrotherapy.—*A. Steindler, Iowa City, Ia.*

A Revolution in Treatment of Congenital Dislocation of Hip in Young Children. By Henry W. Frauenthal, M. D., Physician and Surgeon-in Chief, Hospital for Deformities and Joint Diseases. *The Journal A. M. A.*, Vol. 74, No. 2, January 10, 1920.

TECHNIC.

The pelvis is held fixed by an assistant, the thigh is completely flexed on the abdomen; pressure is made on the knee which brings the head of the femur under the acetabulum, and as the leg is rotated outward in the flexed position, the head of the femur is raised into the acetabulum, with the fingers of the other hand. The whole procedure is accomplished in less than a minute's time. The child is immediately placed on the ground and allowed to walk; and in one case, a child, aged 2 years, walked seven blocks on leaving the dispensary, immediately following the operation.

The method is not adapted to children that have walked on the affected limb for six months or more; then the old Lorenz method must be resorted to. It is effectual only when the child first starts to walk; and the oldest patient in whom I have been able to make the correction effectually was 2½ years of age.

CONCLUSIONS

From the observations of Thompson, Davis, and other anatomists, one may conclude that:

1. Before the child bears weight and develops muscular and ligamentous contraction, the acetabulum and head and neck of the femur are normal in a large percentage of cases.

2. With normal conditions prevailing, there is no reason why the condition should not be regarded and treated as a traumatic dislocation and replaced in the same manner, and the child permitted to go about.

When the large percentage of good results accomplished by this method are compared with those of the Lorenz method, and the great saving of time and mental suffering, this, in the future, must be the method of choice and trial, to be followed by the plaster-of-Paris fixation, if there develops a failure of retention.—*Leo C. Donnelly, Detroit.*

THE RESULTS OF RESECTIONS. Kermisson. *Revue d'Orthopedic*, September, 1919.

This paper is based on observations extending over a period of twenty years in a large orthopedic clinic in Paris. A total of 201 cases of resection were studied. Of these, 118 were of the knee, 42 hip, 19 elbow, 20 ankle and 2 of the wrist.

1. Resections of the knee.—It is impossible to speak of results in general of resections of the knee, because of the great difference in different ages of the patients. The cases are therefore grouped. Twenty-six were under 5 years of age, 22 between 5 and 10, 8 between 10 and 15, 62 over 15.

On the whole it may be said that the results in those patients under five were more or less unfavorable. Two of them still had motion and had to wear braces. Eighteen showed various vicious deformities such as flexion, hyperextension and genu varum. In six there was more or less shortening. One boy who had resection at four years had at eight years, a shortening of 13 cm., a flexion on the thigh at 135° and a little motion necessitating the wearing of a brace. By the time he was 15 the osseous consolidation was complete with the knee in almost complete extension but with a shortening of 22 cm.

Another boy who had had a resection at 3 years, showed a shortening of 10 cm. when he was 10 years old, and of 22 cm. at the age of 17. A girl of 16 showed a shortening of 21 cm. after resection at 3 years of age and a boy of 19 had a shortening of 23 cm. with flexion at 120° and marked genu varum. A man of 35 who had had his knee resected at 4 showed a shortening of 27 cm. and a flexion of about 120°.

For the group of 22 cases between 5 and 10 years old the late results were observed to be practically the same as for those under 5, that is, shortening and flexion and genu varum. A valgus position was noted in only two cases out of the 22.

As we approach the age of 15 we note that the results become a little more favorable. Of the group of cases resected when over 15, 29 out of 62 showed a solid knee in good position capable of giving excellent service. In only 3 was there any considerable shortening, 2 of which were resected at 20 years and one at 25. Five cases presented a poor position of the knee usually a varus deformity. Twenty cases had a persistent mobility, necessitating the wearing of a brace; most of them had had a prolonged suppuration. It is noted that most of these bad results were in cases where resection was done at a more advanced age, 35 to 40 years.

2. Resections of the hip.—The number observed in which resection had been done under 5 years of age was 9. In one case resected at 3, seen 10 years later there was a persistent sinus, mobility, slight adduction and 8 cm. shortening. A boy of 9 resected at 5, had an upward dislocation of the femur, 5 cm. shortening and flexion-adduction deformity. Another, resected at 18 months showed complete mobility, loss of quadriceps power, genu valgum and a shortening of 22 cm. at the age of 14. A fourth case, resected at 5, had a fairly useful hip at 16, although 10 cm. short. In the remaining 5 cases the results were satisfactory as far as position of the hip was concerned, but shortening of from 7 to 12 cm. was present in all.

In many of the resections of the group between 5 and 15 years of age there was a persistent fistula and shortening of from 6 to 18 cm. In 10 out of the 23 of this group the results were considered as satisfactory, some of them even had a little motion. The conservation of motion, although a good thing to have in the end, may be a disadvantage during the early months after resection as it predisposes to a vicious position.

Patients who had resections of the hip when over 15 do not seem to show any better results than those done before that age. There is shortening in almost all the 10 cases reported in this group and in one case an upward dislocation.

3. Resections of the elbow.—Nineteen cases are reported. Ten showed good function with freely movable arms. Nine others had movable arms with fairly good use. One patient had an anterior displacement of the humerus which prevented rotation of the forearm although flexion and extension were preserved to a certain extent.

4. Resections of the ankle.—In general it may be said that the results in the 20 cases studied were favorable. Sometimes a tendency to varus or valgus was noted but the patient was able to stand on the sole of the foot. Cases in which too much was resected or in which the operation was done at an advanced age, showed poor results usually with considerable atrophy. One woman who had had a tibio-tarsal resection at 26 had to wear a brace on account of an equino-varus deformity and a shortening of 8 cm. A boy of 18 was unable to bear any weight on his foot, which was practically reduced to a stump, and could move only his great toe as a result of a very wide resection of his ankle, when 9 years old. Two others are mentioned as bad results after too wide resection, one of which showed marked atrophy and 15 cm. shortening, the other an ankylosis in marked equinus.

5. Resections of the wrist.—Only two cases are reported, both with bad results. In one the hand falls in an attitude of radial paralysis with a lateral deviation toward the ulnar side. The other resected at six months and now 38 years old, has a useless flail wrist and can use his fingers only with the aid of a splint to support the wrist.

In summary, the author states as general conclusions that (1) the results are more favorable after 15 years of age, (2) the knee often shows a vicious position after resection, (3) the state of the surrounding muscles is of prime importance in the results of a resection, (4) it is usually better to have an ankylosed hip than a movable one which has no muscular control.—*William Arthur Clark, Rochester, Minnesota.*

Bone Fistulas After War Wounds. By Pedro Chutro, Beunos Aires. *The Journal of the American Medical Association*, Vol. 73, No. 10, September 6, 1919.

The bone fistula is established as a consequence of an insufficient treatment of wounds, whether it is because one has performed an incomplete operation leaving metallic foreign bodies, fragments of clothing, or bone fragments

which are transformed later into sequestrums, or whether one has not been able thoroughly to clean the wound, or has not been able to take the necessary steps to avoid secondary infection. The anatomic lesion is simply a limited osteitis, which easily becomes chronic.

Two factors dominate all the process of the bone fistula: First, the presence of a cavity with rigid walls; second, the infection of this cavity.

It is the cavity and the infection of the cavity which dominate the process, the one being essential to the other, and the removal of only one of these factors is not sufficient to obtain healing.

In the body, every real cavity must have a communication with the exterior, and the fistula is in reality only the exit of these bone cavities.

Bone is a specialized tissue whose evolution is terminated, and which by itself is incapable of furnishing bone to fill the cavity. It is equally incapable of giving healthy granulations; unhealthy bone only produces fungosities. These fungosities are the product of the infection of the wall of the suppurating cavity, which provokes the necrosis of little bony lamellae, around each of which grows a granulation. Sometimes these fungosities are flat and only line the wall of the bony cavity; in other cases they are exuberant and apparently fill all the cavity; but it is always easy to pass a probe between the fungosities and to feel denuded bone in the depth.

Some cases come to eliminate all the little sequestrums, and after months or years the fungosities sclerose, giving a cure of variable duration; more frequently this spontaneous cure does not take place. Bone is a tissue which defends itself poorly against infection, and once infected, it reacts in a peculiar manner, seeking to limit the process by the formation of new bone around the focus but without succeeding in cicatrizing the lesion.

Efforts have been made to establish the degree of depth of the infection of bone, and we have arrived at the conclusion that the infection is very superficial.

The bacterial flora is of the richest, and one finds all the aerobic and anaerobic organisms which inhabit these cavities communicating with the exterior.

Bone Fistula Distinguished from Osteomyelitis: This lesion is different from the ordinary osteomyelitis which commences by an infection in the metaphysis, and it follows its evolution, whether toward the periosteum through the haversian canals, or toward the marrow cavity through the spongy tissue.

Cases of bony fistula present little of the phenomena of infection because the cavity, communicating with the exterior, has little retention. Again, all the lymphatics around the focus are blocked, consequently there is no absorption of the septic products.

The treatment of bone fistula is variable, from a technical point of view, according to the bone involved, and in each bone, according to whether the lesion is located in the diaphysis or in the epiphysis.

It is necessary to place the incisions in appropriate regions even disregarding the site of the fistula, in order to avoid certain difficulties later. A straight incision on the anterolateral aspect of the tibia causes retraction of the skin which will cicatrize enormously. An incision placed on the anterior aspect of

the thigh will give rise to serious functional trouble on the part of the quadriceps; and, if the wound heals, there will remain a deeply depressed scar, adherent to the bone, which easily ulcerates. The incision placed behind the trochanter causes difficulty in the function of the gluteus, and sometimes phenomena of compression of the sciatic. The same is true of the upper extremity.

The intervention of the bone will consist in the suppression of the bony cavity, the principal cause of the fistula. To effect the intervention, it is necessary completely to resect one of the walls of the cavity and by preference, that which is located far from important structures such as the nerves, but near muscular masses. There will remain only half of the bony cavity in the form of a simple depression, that part which was infected will be relieved of its fungosities and its sequestrums by a curettage, gentle but careful.

The cicatrization of bone is brought about by granulations, but the granulations will not come from bone; they will come from the depth toward the periphery and will grow from the neighboring muscles. These granulations will, little by little, cover the vivified surface of the bone until they cover it entirely, and from that moment the healing of the lesion is assured.

To arrive at this result, it is necessary that the vivified surface of the bone be maintained sterile during several weeks, or during the time necessary for granulation. It is here that the treatment of Carrel-Dakin finds its application. Irrigation of the wound for several weeks permits it to be maintained clean.

We do the contrary of that which others have done, instead of sterilizing the wound before interfering, the first operation is done then irrigation to maintain the result of the operation and to favor healing. If the operation has not been satisfactory, the irrigation does not augment the chances of cure.

The Esmarch bandage is not employed. The most careful hemostasis of the soft parts is secured, and irrigation is commenced immediately after the operation.

A compress left for twenty-four hours is the best medium for the reinfection of the bone which has just been cleaned. Infection of the bone takes place in a few hours.

The tibia, so accessible to the sight, has permitted us to study the different phases of the cicatrization. Certain cases in which the wounds were not irrigated until several hours after the operation presented later little bony surfaces refusing to receive the granulations coming from the muscles, and the following interpretation is arrived at: A clot having adhered to the bone, the Dakin solution maintained sterile the surface of the clot, but not the part of the bone to which the clot adhered. The fluid commences to act when the clot has been detached. That is why irrigation is commenced immediately.

When the bony surface is completely covered by granulations, one can close the wound secondarily, but this procedure does not present great advantages, rather disadvantages. The scar adheres too closely to the bone and this has no pad of protection. Irrigation is continued until complete healing is accomplished, with the aim of obtaining a cicatrix that is more supple, and especially

to have a greater quantity of connective tissues separating the skin from the bone.

When the wound is healed, the complete removal of the cutaneous scar is performed under local anaesthesia, and the most complete reconstruction possible of all the anatomic planes.

We have come to establish different types of operations which have obtained very satisfactory results. Several hundred of these fistulas have been operated upon. The first cases were failures, but in the last series of 329 cases all the wounds of the humerus have healed, also wounds of the ilium; five femurs and three tibias have not healed.

All patients, before entering Buffon, had already been operated on between four and twenty-three times, and treated with the whole series of antiseptics and pastes that were invented during the war.—*Leo. C. Donnelly, Detroit.*

TREATMENT OF GUNSHOT FRACTURES. By Jos. A. Blake, M. D., New York. *The Journal of the American Medical Association*, Vol. 73, No. 10, Sept. 6, 1919.

The limits imposed on this paper demand the briefest statement of facts and the omission of theory.

A projectile, when producing a fracture, passes through the soft parts and strikes the bone:

1. It may then be arrested but deliver enough force to break the bone. Such fractures resemble the ordinary fracture produced by direct force. In such a case, no foreign material is carried into the bone or marrow cavity, and such fractures are termed fractures by contact.

2. It may enter the bone and lodge, and produce either a hole (partial fracture) or a complete fracture with more or less shattering. Such fractures always contain foreign material. They are termed penetrating fractures.

3. It may pass through the bone and produce a hole or extensive shattering and comminution. The velocity of the projectile is imparted to the fragments, which lacerate or tear completely through the soft tissue on the opposite side of the limb. These fractures are termed perforating, and may be incomplete or complete, and may be accompanied by an extensive loss of substance. They may or may not contain foreign materials. Usually portions of the projectile remain in the wound and frequently fragments of clothing.

On account of the difference in structure, the effects of the projectile on the epiphyses and diaphyses differ greatly.

Because of the dense structure of the diaphyses and the violent vibration set up by the impact of the projectile, extensive fissuring and traumatism remote from the point of contact may occur, as evidenced by hemarthrosis of the contiguous articulations. The spongy, elastic structure of the epiphyses absorbs rather than diffuses the energy of the projectile, and the lesions are generally restricted to the epiphyses. Even in the case of small penetrating wounds, multiple or diffuse hemorrhagic areas may occur, leading to disseminated infection and necrosis.

Operation to prevent or eliminate infection is not indicated in fractures caused by rifle balls, when the wounds of entrance and exit are punctate. Operation is indicated in all fractures caused by shell or grenade fragments. In fractures caused by shrapnel balls, operation is indicated only if good technic is possible, as these wounds frequently escape infection.

In transportation of fractures, the Thomas leg and arm splints are most efficient. Every civil ambulance should be equipped with them.

1. In every fracture of a long bone, the proximal fragment tends to occupy a certain position, which is determined by the muscles attached to the fragment. The forces produced by these muscles may be termed intrinsic.

2. This position, which may be designated as the position of rest, is readily modified up to certain limits by any slight extrinsic force, that is, one operating from without.

3. Conversely, if a slight restraint is supplied, considerable motion at the proximal articulation may occur without there being any change in the absolute position occupied by the fragment.

4. Traction on the distal fragment not only prevents overriding and shortening, but when applied in the direction of the axis of the proximal fragment, when in the position of election or rest, also tends to prevent harmful angulation at the site of the fracture as a consequence of the restraining action of the sheath of the stretched muscles about the proximal fragment.

5. Proper counter balanced suspension, by allowing the limb to follow the body permits a certain latitude of movement of the latter in bed without deranging the relative position of the fragments.

6. Traction, in order to accommodate itself to the position of the patient (unless the traction is contained within the splint) must be made by a weight and cord running on a pulley; and the pulley should be as far as possible from the point at which traction is made, so as not to limit the swinging of the limb.

7. The lack of fixation in permitting a certain amount of motion between the fragments does not delay union; consolidation seems to be more rapid, probably because of better nutrition.

8. In fractures of the humerus and femur, in both of which fixation of the proximal fragment is impossible, the limb being free to follow the movements of the trunk, no violent angulating strains occur at the site of fracture.

9. With traction and suspension properly applied, it is possible to move all of the joints of the fractured limb throughout the treatment, no matter which bone is fractured.

The principles of treatment are: To avoid actual fixation; to employ traction to its fullest possibilities in overcoming deformity, and to use suspension so as to afford the greatest freedom of movement, both of the truck and of the joints. The chief and underlying principle is conservation of function.

When possible, in all fractures of the femur, skeletal traction preferably with Ransohoff's tongs is made directly on the lower fragment, and in some cases of fracture of the lower one-third, the tongs may be used to lift the distal fragment into position by elevating the axis of traction.

The Thomas is the most useful and practical for fractures of the thigh and leg, but it must be used intelligently. For some cases the half ring modification of the Hodgen splint are preferable.—*Leo C. oDnnelly, Detroit.*

OSTEITIS FIBROSA. E. G. Slesinger, M. B., F. R. C. S. *The Lancet*, No. XX of Vol. LL, 1919.

The condition known as osteitis fibrosa is now recognized to be a great deal more common than was at one time supposed.

Etiology—Many theories have been advanced to account for this condition since Virchow's original description of two cases which he regarded as the result of degeneration occuring in a chondroma. At the present time opinion is fairly evenly divided between the views that (1) it represents a metaplastic transformation of the bone marrow into a fibroid tissue, and (2) that it is the result of a chronic inflammation of unknown origin occurring in the endosteum. Whatever view is held as to the exact pathology certain predisposing factors are fairly constantly present.

Trauma has been offered as an explanation but has not been well established. Sex seems not to be a factor, but age does seem to have some bearing, a great majority occurring before the 20th year and the commonest age about the 12th year. A typical series runs as follows: 97 cases, 75 before 20th year and 22 after.

Bones Affected—A single series will be cited for brevity: 38% femur, 22% in the tibia and 16% in humerus.

Pathology—The essential pathology of osteitis fibrosa is still uncertain but the naked eye and histological picture is fairly definite in cases showing cyst formation. The cavities may be present as numerous small spaces or as one single cyst, often of considerable size. In a majority of these cases a definite cyst wall can be demonstrated with the characteristics of osteitis fibrosa. The fluid is not under much tension and is seldom haemorrhagic, but is clear, light brown in color and often of considerable quantity. The surrounding bone is thinned with no evidence of new bone deposits, and extends as a rule up to the epiphyseal line. Histologically the marrow is seen to be replaced to a greater or less extent by fibrous tissue evidently formed from the endosteum, and there may be evidence of active bone formation and absorption. Giant cells may be formed in excess in the neighboring tissues. Culture of the fluid taken from the cysts has so far given a negative result.

Symptoms—Onset very gradual, pain usually absent, in cases of lower limb a slight limp being the first symptom elicited by the patient. This grows progressively worse. Tenderness on palpation may be well marked, and sometimes egg-shell crackling may be demonstrated, pathologic fracture or fracture from slight violence may result.

Diagnosis—X-ray may show trabecula formation, with expansion and thinning of the bone in the region of cyst formation. The clear areas may be prolonged down the shaft. The differential diagnosis between osteitis fibrosa, mye-

loma and other cyst forming conditions, and in some cases, tuberculous disease may be difficult or impossible.

Limitation of motion in osteitis fibrosa is merely that of the resulant deformity while in other conditions it is likely to be in all directions. In many cases diagnosis can only be made at operation ,and microscopical examination of the cyst membrane. In many cases only a guarded pathological opinion can be given.

Treatment—Operative, cutting through the bony shell so as to expose the affected area, which is then thoroughly curetted until all the affected tissue is removed. The resultant deformity should be corrected. Only two cases of death from hemorrhage have been reported. The old method of amputation seems to be unnecessarily severe.

Typical Case Report—C. M., male, twelve years, hospital, 1915. He had broken his arm after slight violence three years before and again a year later. Three weeks before attending hospital he had sprained his arm and worn splint, and a few days later fell and fractures it. There was no pain but on examination swelling the size of an egg could be felt below the neck of the humerus. X-ray examination showed a growth expanding the bone and thought to be an endosteal sarcoma. At the operation performed by Mr. Tagge a thin walled cyst with a definite lining membrane was found, and this was cleaned out and packed with decalcified bone. The material removed proved to be a blood clot, fibrous tissue, and marrow with an excess of normal looking multi nuclear giant cells. This patient had no further trouble with his arm and is quite well four years after operation.—*James R. Elliott, Kansas City, Mo.*

FOOT PROPHYLAXIS IN CHILDHOOD. J. Torrance Rugh. *Pennsylvania Medical Journal*, December, 155.

The author estimates that 98 per cent of foot disabilities in childhood are mechanical in origin and character. Of the bony changes, one of the most common is a hyperthrophy of the inner part of the scaphoid impinging on the head and neck of the astragalus. Instead of a hypertrophy, there may be a supernumerary bone in this same position. Both of these conditions cause a limitation in adduction of the anterior part of the foot so that the body weight falls too much to the inner side. This condition may be incurable. Two forms of treatment are advised. The heel and sole of the shoe may be built up on the inner side and a pad of felt or leather placed under the inner part of the longitudinal arch to produce an adducted position, together with exercises for strengthening the inner group of muscles. The other form of treatment is to remove the hypertrophied part of the scaphoid on the supernumerary bone, destroy the astragalo-scaphoid articulation transplant the tendon of the tibialis posticus farther forward on the internal cuneiform and hold the foot in extreme adduction in plaster for about two months, following which the shoes are changed and exercises given as in the conservative form of treatment.

A short tendo Achilles is responsible for disability in from 10 to 15 per cent of children. The pull of the shortened tendon rotates the os calcis turning the entire foot outward. The proper treatment is to lengthen the heel tendon and after firm union, massage and exercises of the muscles, the child being allowed to walk with inner edge of shoe-heel and sole raised. This usually requires about six months to restore muscle function and tone.

Prophylaxis in shoes and stockings for children is of great importance. Wool stockings on account of shrinking may cause quite appreciable cramping of the toes. They should be dried over forms to retain their proper size for the foot. The shoes are more frequently too short than too narrow in fitting children. It should be realized that a shoe will stretch in width but never in length. There should be at least half an inch between the end of the longest toe and the end of the shoe when the child stands up.—*William Arthur Clark.*

Obstetric Paralysis (Erb's Palsy) with a Report of Seventeen Cases. By Samuel W. Boorstein, M. D., N. Y. *Medical Record*, Vol. 96, No. 20, Whole No. 2558, November 15, 1919.

It is an established fact that in all forms of flaccid paralysis a great deal can be accomplished by orthopaedic methods, if treatments are begun early and contractures guarded against.

Etiology.—The review of literature of Sever shows that the majority of observers believe that Erb's palsy is due to a stretching or tearing of some of the roots of the brachial plexus caused by forcible separation of the head and shoulders during delivery.

Pathology.—There are two well recognized types of paralysis seen. The more common one consists of a lesion which involves the fifth and sixth cervical roots and the suprascapular nerve and produces paralysis of only the muscles of the upper arm with the exception of the supinators. This is known as the upper arm type. The less usual type, the so-called lower arm or whole arm type, is the result of injury, not only to the fifth and sixth cervical roots, but the seventh, eighth and possibly the first thoracic as well. Here the whole arm is flaccid; there is a wrist drop and paralysis of the small muscles of the hand. There rarely occurs the pure lower type of paralysis without any involvement of the upper cords of the plexus.

The nerve sheath in any overstretching process must give way before the nerve itself, as it supports the nerve. When the sheath is torn, as it always is in cases of birth palsy, the arterioles belonging to it and supported by it are ruptured, and a hemorrhage into the substance of the nerve and its sheath results. Were it not for the obstructive features of the repair process in the nerve sheath, we might expect a more or less complete recovery in the majority of cases. Four pathological specimens showed on study the following conditions: The usual seat of the lesion was at the junction of the fifth and sixth cervical nerves. The perineurial sheath presented many old dense pigmented deposits, the site of old hemorrhages. In some persons the perineurial sheath was

buckled inward on the nerve fibres, strangulating them and preventing their regeneration. Evidences of strangulation were present not only at these points, but also in the nerve fibres underlying these pigmented deposits. There was an obliteration of the myelin sheath above and below. In the more severe cases the strands of the plexus involved came to an abrupt termination in a mass representing an old organized hemorrhage. There was a severing of the nerve fibers, which were often thrown into fold for some distance from the primary lesion. Repair of the nerve sheath takes place before regeneration of the nerve fibers, and if this has buckled inward on the nerve bundles following relief of tension, the nerve fibers are inevitably going to be strangulated and their regeneration prevented.

ROENTGEN-RAY FINDINGS.—In the first year there is usually nothing seen of bony deformity. There may be a slight posterior sub-luxation of the shoulder joint, but there is never any acromial deformity evident by roentgenogram or clinically. No case has been observed in which the epiphysis has been displaced so far as could be seen by comparison with the normal shoulder. The epiphysis, as well as the shaft of the humerus, is always smaller than the unaffected side which condition is undoubtedly due to atrophy from disuse. The scapula is practically always elevated and outwardly rotated, due apparently to the pull of the intact inward rotators and the levator anguli scapulae. As time goes on and the child gets older, one begins to see increasing evidences of bony deformity, occasionally more joint subluxation than at first, increasing outward displacement and elevation of the scapula, and acromial deformity. The deformity of the acromion consists of a bending downward and forward or a hooking of its outer end, which apparently have no bony resistance to meet as normally in the head of the humerus, projects downward in front of the subluxated and inwardly rotated head. This hooking seems to vary directly with the degree of posterior subluxation and inward rotation of the humerus and tends to increase as the child gets older, provided subluxation is present. No case has been observed in which there has been a total subluxation or dislocation of the shoulder joint backward. The clavicle usually is shorter and its curves are more acute than its normal follow.

The hand grasp is usually good and the child flexes and extends the wrist and fingers well. The later developments in the upper arm cases, as the child grows and gets older, with or without exercise and massage, are as follows: The persistence of the inward rotation and adduction deformity, the so-called policeman's tip position, the inability in most cases to fully or freely supinate, the inability to get the hand to the mouth without raising the elbow, due to inability outwardly to rotate, the inability to put the hand to the head or behind the back. In the lower arm type all these conditions hold, besides the additional ones due to the paralytic conditions of the lower arm and hand, resulting generally in a useless dangle arm. Atrophy of the muscles in these cases of obstetric paralysis is never very marked, except in some cases of the lower arm type. One never sees the extreme atrophy so noticeable in cases of infantile paralysis. The lack of marked atrophy is undoubtedly due to the fact that the nerve impulses are rarely fully blocked and that the muscles practically never, except in rare cases, wholly loose their entire enervation. Some normal nerve impulses

pass through the scar tissue at the side of the lesions owing to incomplete destruction or injury of the nerve, and so keep the muscle tone up to a certain point. There is always a definite shortening of the arm in all cases due to nerve injury as well as lack of use.

DIAGNOSIS.—Look for a fracture of the clavicle or arm or a separation of epiphysis.

Look for tenderness and swelling about the joint and tenderness on pressure above the clavicle over the course of the brachial plexus. Tenderness in the axilla may also indicate and exudate about the lower portion of the plexus.

Look for inequality in pupils, as that without question implies an injury to the inner cord of the brachial plexus high enough up to cause stimulation of the sympathetic branch of the cervical sympathetic plexus, which sends off a communicating branch from the fifth cervical segment of the cord.

Look for a dislocation or subluxation of the shoulder posteriorly.

PROGNOSIS.—The prognosis in all upper arm type of cases is good provided the case is watched from the start and treatments properly carried out. The patients are practically all able to raise the arm to the shoulder lever and can use the hand and lower arm well, except for varying degrees of supination. In the lower arm type the outlook is not so good, although many of the patients regain use of the upper arm in spite of the persistent paralysis of the lower arm and hand.

TREATMENT.—As to treatment, the upper arm type can, if seen early, be treated with support, massage and exercises. Those of the lower arm type usually have to be operated on for the repair of the plexus. If the upper arm type comes late for treatments, one has also to operate on and correct contraction deformities. Even in lower arm type one may try for a very short time conservative treatment and if no improvements are noticed in a few weeks, operation should be resorted to.

In order to prevent contraction of paralyzed muscles, it seems best to put the arm at rest in such a position that the stronger muscles cannot contract. This may be done by holding the arm in a plaster cast, or by use of a light wire splint.

POSITION.—The arm should be abducted to a right angle with the torso or perhaps a little elevated so as to approximate the injured nerve. The limb should be rotated outward and the forearm supinated. The hand can be tied to the upper end of the crib. Massage and exercise are of the greatest importance and should be done daily if possible. Where subluxation or dislocation exists it should be reduced. If contractions at shoulder are present one may try a first forcible stretching under anaesthesia.

OPERATION ON THE PLEXUS.—Repair of obstetrical injury to the brachial plexus is often necessary.

CONCLUSIONS.—Obstetric palsy belongs to the domain of orthopaedic surgery as any other congenital deformity of a limb.

2. Obstetric palsy should be treated on the same principle as anterior poliomyelitis and all the deformities should be watched and prevented.

3. The principle in peripheral nerve injuries to prevent overstretching and over use of the denervated muscles should be applied here and the weak muscle watched.

4. The shoulder should be put immediately in a splint or brace to prevent stretching of the deltoid and allow absorption of hemorrhage and repair of the damaged nerves.

5. In most of the cases the injuries to the nerves are not severe and if treated early will recover.

6. About three months may be allowed for conservative treatments in the early cases. If no marked improvement is obtained, an operation on the plexus should be resorted to.

7. Conservative treatments consist of: Proper support, massage and exercises. No use of resorting to the universal panacea, "electricity."

8. Taylor's operation on the plexus is very useful and should be performed after conservative treatments have failed.

9. The contracted pectoralis major, subscapularis and teres major should be cut by Sever's method if effectual results be desired.

10. A patient suffering from this affection should be under proper observation at least till the age of ten as slight deformity may persist.—*Leo C. Donnelly, Detroit.*

GUNSHOT FRACTURES OF THE TIBIA AND FIBULA. OBSERVATION ON THE PATHOLOGY AND TREATMENT. By Frederick Christopher, M. D., Chicago, Ill., Formerly First Lieut., M. C., U. S. A. *Annals of Surgery*, Vol. LXXI, January, 1920, No. 1.

By far the most satisfactory instrument, in the opinion of the writer, is the "skate" devised by Major M. Sinclair, R. A. M. C. This skate has been described by Colonel Blake and his associate, Captain Bulkley, as follows: "It consists of a block of wood a little longer than the foot and very slightly wider, in the free edge of which are cut about ten notches. This center contains a longitudinal slit through which passes a bolt provided with a thumb nut on the exposed side. The side of the board toward the foot is padded with cotton and covered with gauze. The transverse bar is made of iron 5 millimetres thick, 2 centimetres wide and 15 centimetres long, with a hole at the center and each end. With glue 8 or 10 narrow tapes are pasted along each side of the foot, each tape having previously had attached at the end toward the sole a small curtain ring. The bands over the dorsum of the foot do not meet in the midline, but leave a free area to prevent constriction and interfere with the circulation. The foot is fastened to the board by lacing the ring on each side to each other on the under surface of the board. The apparatus forms practically a ball-and-socket joint for the control of the position of the foot. The lower free edge of the transverse metal bar rests on the parallel bars of the (Hodgens) splint and maintains the position of the foot in the position in which it is placed. To elevate

or depress the foot as a whole (correct posterior or anterior angulation at the site of the fracture) the wooden block is slipped upward or downward on the transverse bar, and the thumb screw tightened. To abduct or adduct the toes (rotate the lower fragment inward or outward) the block is rotated on the transverse bar and there fixed. To evert or invert the foot as a whole (correct lateral angulation at the site of the fracture) the cord leading from one extremity or the other of the transverse is shortened. The 'skate' is especially useful in very low fractures of both bones and in fractures involving the ankle-joint."—*Leo C. Donnelly, Detroit.*